

THE IRON AGE

Established
1855

New York, July 13, 1911

VOL. 88: No. 2

Published Every Thursday by the
DAVID WILLIAMS COMPANY
239 West 39th Street, New York

Entered at the New York Post Office as Second-Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.
Single Copies, 20 Cents.

W. H. Taylor,	-	-	-	-	President and Treasurer
I. A. Meehl,	-	-	-	-	First Vice-President
Harold S. Buttenheim,	-	-	-	-	Second Vice-President and Secretary

Geo. W. Cope,	-	-	-	-	} Editors
I. A. Findley,	-	-	-	-	
W. W. Macon,	-	-	-	-	

Branch Offices

Philadelphia, Real Estate Trust Building	Chicago, Fisher Building
Pittsburgh, Park Building	Cleveland, American Trust Building
Boston, Compton Building	Cincinnati, 807 Andrews Building

CONTENTS.

Steel Companies Take a Vacation.....	71
Important Discovery Regarding Oil Adulteration.....	72
Unfit Blast Furnaces.....	72
Suiting Processes to Conditions.....	72
Workmen's Foolish Investments.....	73
The Iron Age Index.....	74
Safeguarding Workmen in Small Plants.....	74
The International Steel Conference.....	74
Personal	75
Obituary	75
Customs Decisions.....	75
The Iron and Metal Markets.....	76 to 85
Lake Ore Shipments for May.....	85
Iron and Industrial Stocks.....	85
Iron and Steel Expert Wanted.....	85
Trade Publications.....	86
Standards of Safety in Relation to Machinery.....	88
Furnace Slags in Concrete.....	90
Tests of Metals, 1909.....	90
Detecting Adulteration of Oils.....	91
Lifting Magnets in Foundries.....	92
Pure Irons from the Open Hearth Furnace.....	94
A New Baltimore Business Organization.....	95
The Steel Corporation's Unfilled Orders.....	96
The Wheeling Corrugating Company's Catalogue.....	96
Birmingham Notes.....	96
A British Handbook for Iron Founders.....	96
June Copper Production and Stocks.....	96
Ductility in Rail Steel.....	97
Railroad Equipment Orders.....	97
Mallet Articulated Locomotives on Ore Railroads.....	97
The Manila Times.....	97
New Publications.....	97
Lake Superior Mining News.....	98
The Sulphuric Acid Corrosion Test.....	99
An Oil Gas Producer.....	100
The Gary Sheet-Bar Mill.....	102
A Garvin Plain Milling Machine.....	105
Improved Tool and Cutter Grinder.....	105
Shop System of Ferracute Machine Company.....	106
New Parallel Grinder.....	110
The Federal Heater Company.....	110
Automatic Oiling System.....	111
Sewage Disposal for a Hardware Works.....	112
The Machinery Markets.....	115 to 123
Government Purchases.....	123
The Albree Iron Works.....	123
Mesta Shipments.....	123

Steel Companies Take Short Holiday Now Operating as Well as in June

Conditions continue to warrant the belief that the volume of business in the iron trade for the coming six months will show a considerable gain over the bookings of the first half of the year. The steel companies have taken less time than usual this year for midsummer repairs and inventories, and this in itself strongly indicates a better demand from consumers. The steel mills in the Pittsburgh and Youngstown districts are now operating as well as in June, or to between 70 and 75 per cent. of their capacity. The United States Steel Corporation is this week running slightly over 67 per cent. of its entire steel ingot capacity and this rate is shortly expected to be increased. The corporation gained only 11,000 tons in its accumulation of pig iron in the two weeks extending over the dull period of the latter part of June and beginning of July. It has made a net gain of two blast furnaces in operation, two additional stacks having been blown in at Ensley, Ala., to furnish pig iron for the Tennessee plant. The fact that its unfilled order statement for July 1 showed an increase of 246,871 tons, compared with June 1, has a further decidedly favorable bearing on trade conditions. The increase is considerably more than had been expected.

The week shows excellent bookings for finished products. Orders were placed in Chicago for 13,000 tons of rails while contracts for structural material exceeded 20,000 tons. The week's awards in structural material in New York comprised about 13,000 tons. Negotiations are pending for substantial tonnages of rails with Western and Northwestern roads, and orders for steel cars are steadily increasing. An interesting episode of the week was the statement issued by the Department of State, Washington, that contracts for 4100 tons of armor plate for an Italian war vessel had been awarded by the Italian Government to the Bethlehem Steel Company and the Carnegie Steel Company in competition with British, French and German manufacturers.

The pig iron situation presents some conflicting phases. The Eastern Pig Iron Association reports a heavier decrease in June in stocks of pig iron held by its blast furnaces than in any previous month this year. Members of that association who have been taking business at concessions have now practically withdrawn from the market, one company being reported to have sold within 30 days about 90,000 tons of pig iron, half of which was basic, and most of which selling was done quietly or under cover. In the Birmingham district in Alabama in June an increase of only 1000 tons in pig iron stock was made, the movement from furnace yards having exceeded expectations.

Notwithstanding these rather encouraging conditions, pig iron prices show a further tendency to weaken. A round lot of basic iron has

S. DIEGHER & SONS
Mechanical and Civil Engineers,
PITTSBURGH, PA.

been sold in eastern Pennsylvania at \$14.25 delivered. Foundry iron is also slightly lower at Cleveland. Good sales of basic have, however, been made in eastern Pennsylvania at considerably above the price named and further buying is indicated. Large inquiries for basic pig iron are reported in the Pittsburgh district. The belief is gaining wider acceptance that the production of merchant furnaces is now below the rate of consumption and that this fact will become more apparent within the next few weeks. Meanwhile the demand may continue somewhat irregular, according to the impression made on individual consumers or the improvement they find in their own business.

Important Discovery Regarding Oil Adulteration

A notable contribution to science based on a discovery of very considerable economic importance has been unselfishly made by Alexander E. Outerbridge, Jr. Others like him have done likewise, but the instance of the successful outcome of the individual's persistence and study is one thing and the generosity of giving to all interested the opportunity to utilize the fruits of the labors is another and the circumstance well merits this special word. Mr. Outerbridge's discovery was given formal publicity in the shape of a paper read before the American Society for Testing Materials. It is that minute quantities of adulterants of high-priced animal or vegetable oils lend the property of fluorescence to the entire mass of the oil and that even the percentage of adulteration may be gauged by ocular inspection. It is not the first public service the discoverer has performed in his now over forty years' professional service. It is to him we owe our early knowledge that the tumbling operation removes the internal stresses common in cast material, and if memory serves rightly his name is closely linked with the use of ferro-silicon. This is not, however, the occasion to write an appreciative sketch of the career of a man who has apparently not yet stopped learning.

The point respecting the adulteration of high cost oils, like linseed, is not only that one is sometimes paying far more than the product is worth, but the resultant mixture does not really meet the requirements as well as the pure product. This is particularly true with the use of treated linseed in core making in the foundry. An equipment of precise physical apparatus for diverting for use the invisible or actinic rays of sunlight is not necessary, but the reflected light of an enclosed arc light in a room of otherwise diffused light serves to develop the fluorescence visible to the human eye. In short the method is intensely suited to daily use in the industrial establishment, requiring neither chemical analysis nor highly skilled operatives. A boy with a bottle of a suspected sample may ascertain the amount of adulteration by comparing the degree of fluorescence with a row of sample bottles of known adulteration. From the scientific side Mr. Outerbridge has intimated that the investigation in fluorescence may open up the study of the question of the true origin of mineral oils. He pointed out that both mineral oils and resin oils are hydrocarbons, but the one has not yet been rendered saponifiable, a latent discovery of high monetary value.

Unfit Blast Furnaces

In our issue of January 31, 1907, editorial reference was made to "The Lessening Number of Unfit Furnaces," it being pointed out that after a period of very high prices the development was that a much smaller

number than usual of furnaces normally unfit had been brought into the running by the exceptionally high prices. The majority of furnaces, it was observed, had been improved and modernized, so that there were fewer normally unfit furnaces in existence than had usually been the case in the past.

Four years later the same observation can be made with emphasis as to the steel works furnaces, but there is a sharp contrast between the steel works furnaces as a class and the merchant furnaces as a class. There are few steel works furnaces which are measurably inferior to the best in equipment and economy of operation, starting with the same raw materials, whereas there are many merchant furnaces far below the standard of the best. Such being the case, we may expect to see, in times of insufficient demand for merchant pig iron, many stacks remaining idle for long periods of time, while some furnaces which have passed to the inactive list only within the past few months may pass to the abandoned list without any further period of activity. The investment thus lost will be relatively small, for there is a very wide difference in cost of construction between the modern furnaces and those of the older types which still survive. Here, indeed, lies a compensation. Even the most modernly constructed furnace may be unable to stay in the race, through shifting of the centers of consumption or through increasing difficulties in securing raw materials on advantageous terms. It must run almost continuously to make returns on the large investment and aim to retrieve this investment within a reasonable number of years. The old-fashioned furnace, on the other hand, can lie idle for a long period without losing much by way of return on its investment, and if it has to be abandoned altogether the loss is relatively light. It is not at all improbable that a number of furnaces which have been in operation within the past twelvemonth will be found in the abandoned class in the next few years. The capacity of such furnaces, however, is a much smaller percentage of the country's total capacity than was the case with the furnaces which the prolonged depressions of the seventies and nineties put out of the running.

Suiting Processes to Conditions

The success which is being made in the production of pig iron by electricity in Sweden helps to illustrate the commercial advantage of suiting the process to the conditions. There has always been a disposition, probably too great a disposition, in the iron trade to run in grooves, for manufacturers all to adopt certain processes because they have proved successful under certain conditions. The iron industry has grown so rapidly that there has hardly been time for careful analysis of principles and selection and adaptation to local conditions.

A large pig iron furnace at Trolhattan, Sweden, has been in operation since last November, starting out by producing three tons of pig iron per horse-power year, and doing better than that since then, and Prof. Joseph W. Richards, in a paper before the Engineers' Society of Western Pennsylvania, predicts that in from five to ten years all the pig iron of Scandinavia will be made by electricity. Professor Richards backs up his prediction by plain statements. Even in pig iron furnaces (not "blast furnaces"—there being no blast in an electric furnace) which were not working under conditions which can be attained the cost has been

materially less than in the ordinary charcoal furnaces. In Norway and Sweden there are many water powers available, far from centers of population but near rich deposits of iron ore, where power can be produced in large quantities at from \$4 to \$8 per horse-power year, and even at \$8 per horse-power year there is computed a saving of \$2 per ton of pig iron over the charcoal blast furnace.

The supply of charcoal in Sweden has become limited, owing largely to the requirements for paper pulp, but Professor Richards states that there is promised a supply for years to come sufficient to make 300,000 tons of pig iron a year by the straight blast furnace process—charcoal made from wood which is not available for pulp. It is to be observed that a few years ago the production of pig iron in Sweden was running above 600,000 tons annually, whereas in 1908 and 1909 it was much decreased, although of late considerable pig iron has been made with coke imported from England—clearly a temporary expedient. The argument is that as it requires only one-third as much charcoal to use the electric pig iron furnace as the straight blast furnace, and as there is much good ore and water power, the development will be rapid toward a condition of making say 900,000 tons of pig iron a year by the electric process, more cheaply per ton than 300,000 tons could be made a year by the old method.

It seems perfectly clear that this will be the future of iron making in Scandinavia, for Professor Richards speaks from personal investigation on the ground, but it by no means follows that an argument is furnished that the process will come to be applied elsewhere, if conditions are different. All the estimates made of cost are comparative, and the limit of their application is apparent when it is observed that, while the electric furnace beats the charcoal blast furnace in Sweden, yet at the present time considerable pig iron is being made in Sweden with coke imported from England. That, then, is also a better way, but it is obviously not one which will be practiced indefinitely, for a still better way would be to operate the blast furnace in England and move the ore.

Under other conditions the electric furnace would show up altogether differently. The reason for the economy is that power is extremely cheap and fuel dear. The low consumption of charcoal is due to the fact that it is used only for the chemical dissociation of oxygen from iron in the ore, while in the blast furnace about two-thirds of the fuel is used to obtain the smelting heat necessary to melt down the iron and slag. Now, in other places, where coke is used but is dear, the tendency is to conserve the heat produced. The only part of the energy of the fuel which is, according to strict theory, irretrievably lost is the part which is used to effect the chemical dissociation of iron and oxygen. The rest of the heat goes out in various ways, and some of these flows can be harnessed and directed. The heat of the pig iron, for instance, is utilized at practically all the steel works in the United States which produce their pig iron, by the employment of the direct metal process. There have already been proposals to utilize the heat of the slag, and probably this in time will be accomplished. In the blast furnace the loss by the conversion of carbon into CO instead of CO₂ is retrieved quite well by the use of gas engines. The electric furnace, working perfectly, produces CO₂ and practically no CO. When there is an attendant steel works with perhaps other industrial operations, most of the apparent losses of the blast

furnace as compared with the electric furnace can be avoided, because they are losses only when the means of utilization are absent.

It is well to take a glance at the proportions of capital required to product obtained. Water power developments in Scandinavia are spoken of as involving capital expenditures of \$25 to \$30 per horse-power year for the hydraulic-electric plant complete. At \$30, and with three tons of pig iron per horse-power year, one has \$10 per ton of pig iron a year for the hydraulic-electric development, or \$1,500,000 against a pig iron output equivalent to that of one of our modern blast furnaces. Power has a safe and permanent value, somewhat like gold in international trade, and \$30 capital investment for a horse power looks much smaller, when thinking of a power proposition, than \$1,500,000 capital expenditure does when regarded as part of the capital expenditure necessary to produce 150,000 tons of pig iron a year, for in the iron industry, on account of its well-known vicissitudes, there must be promise of retrieving the capital expenditure in a moderate number of years.

Such brief comparisons serve to illustrate the principle, more or less new in the development of iron making, that processes must in future be selected with strict reference to local conditions. Where fuel is cheap it may be unwise to adopt on a large scale all the economies necessary to regain all or the major part of the calorific value of the coal. Where it is more expensive it may pay to do this. Where power is very cheap it may pay to employ it in the electric production of pig iron. Development has already started along these lines. In the United States, at any rate, we see the greatest fuel economies at plants farthest from coal.

On account of occasional suggestions of large probable development in countries other than Sweden and Norway of electric pig-iron making, it may not be amiss to draw attention to the proportions. What is a large development for Sweden, for instance, involving several hundred thousand tons of pig iron a year, is a small one as compared with the production of the United States. Taking the latter at 25,000,000 tons a year, power development alone to duplicate such a production would call for a quarter billion dollars at the start, when total expenditures would be on a much larger scale. When the new process is proved feasible at a given point it does not follow that production will soon reach a large figure, judged by American standards.

Workmen's Foolish Investments

One of the responsibilities which is occasionally thrust upon the employer of labor comes from the foolish investments of his workmen. The prospectus which promises large and quick returns for money invested finds many victims among wage earners who have been thrifty and accumulated some means. The employer may be able to save something for the man out of the wreck of his speculation. Usually he feels compelled to make the attempt; it becomes a kind of family affair, for one of his people has been swindled and he is indignant. The promoter of dishonest schemes is naturally more fearful of an established name in the business world than of the poor man who has been led to partial or complete financial ruin.

The workman rarely seeks advice from his superiors in the beginning. The same employer whose

assistance he asks in the crisis would have been glad to explain to him the probable danger of the investment. In a recent instance an intelligent mechanic put all of his hoard of \$1200 into a wildcat enterprise, dribbling the money a little at a time into the treasury of a palpably dishonest corporation until it was all gone. Then he sought the men whose knowledge would have prevented the catastrophe, and begged their intervention in reclaiming his funds. They were successful to some extent.

It is a curious failing of human nature that the apparently most conservative persons, when lacking in business training or instinct, easily fall victims to the promise of riches, made by men entirely unknown to them, concerning mines and plantations and real estate developments, located in places inaccessible to personal investigation. They will yield up their savings until they are safeguarded by a paternal government. In Massachusetts a bill is pending before the Legislature compelling the registration of mining companies doing business in the state, with affidavits of the promoters as to the actual value of the properties and the requirement that no stock shall be issued except as it represents a value equivalent to the investor's contribution. The penalty for the promoter would be, on the face of it, severe, for perjury and criminal misrepresentation of assets are serious offenses under the law, and the courts are quick to do their part toward the extermination of that class of swindlers who prey upon the earnings of the poor. Such a law should extend to fake plantation and farming schemes; in fact, to all advertised investments of the class. It would rid the community of a cause of dependency upon others of workers whose usefulness to industry and business has passed.

Some employers have exerted a beneficent influence in their works by their endeavors to keep their employees out of this kind of trap. Possibly the effort could be systematized. However, the government's stamp of disapproval would be the best remedy, such as may be secured when a national corporation act is established.

The Iron Age Index

The index to Volume 87 of *The Iron Age*, January 1 to July 1, 1911, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is kept in this office, and to all such the latest will be mailed without notice from them. Additional names will be put upon this list on request.

Safeguarding Workmen in Small Plants

David S. Beyer, chief safety inspector of the American Steel & Wire Company, in a paper on "Standards of Safety in Relation to Machinery," published elsewhere in this issue, urges strongly that small manufacturers give more careful study to the safeguarding of his work against accidents to employees. At the same time he tells them that the United States Steel Corporation passes out freely the benefits of its experimental work to all, even including those who are in competition for the same lines of business. The magnanimity, or perhaps it had better be called the philanthropy, of such an offer will be appreciated by those who study Mr. Beyer's article. With compulsory payment of damages for all accidents under workmen's compensation, every manufacturer, large and

small, must for his own interest do everything possible to rid his works of casualties. Otherwise, his charges for compensation will be almost ruinously large, or, if he insures against this risk, the companies will fit the premium to the conditions as they find them.

The International Steel Conference

The international steel conference held at Brussels, Belgium, July 5 and 6, appears to have been satisfactory to its projectors. The information which has been received in this country is that from 120 to 130 individuals were present at the conference, comprising steel manufacturers of Austro-Hungary, Belgium, Canada, England, France, Germany, Italy, Russia and the United States. E. H. Gary, chairman of the United States Steel Corporation, was elected to preside and proceeded to lay before the conference his views concerning co-operation among the manufacturers of the world. He dwelt upon the idea that there should be established and continuously maintained a business friendship which compels one to feel the same concern for his neighbor that he has for himself. He proceeded to explain this as follows: "It is no less in principle than the Golden Rule applied to business. Is it possible? If it is, it will be certain to pay. True it is that sometimes, and too often, deceit is practiced and that advantage has been taken by those who have been given confidence by others, but this fact should dishearten no one." He described conditions in the United States and declared that Americans are anxious to co-operate with their European friends. Representatives of steel industries of other countries, especially those who visited the United States last year, spoke with hearty support of Judge Gary's ideas. It is the expectation that an international body, possibly to be known as the International Iron and Steel Institute, will be formed on the same lines as the American Iron and Steel Institute. A committee of 30 was selected, of which Judge Gary is chairman, and W. B. Peat, London, is secretary, to work out a plan for such an organization and to report at another conference.

In an interview with Judge Gary in Paris, which appears in the New York papers of July 9, he is reported as stating that the "details of whatever was done or discussed at Brussels will be printed in a few days and that all interested can have a copy of the report by applying to the secretary of the committee in London." Judge Gary said that he terms the Brussels international meeting a conference of peace, and continued as follows:

"Our combined efforts, in fact, have been in the direction of friendly understanding between all steel men, not for the purpose of killing competition, which I believe is necessary, but to make it friendly and fair. For instance, the suggestion that each concern should keep competitors informed of all individual business has been carefully considered. This should put a stop to commercial war and individual attempts to oust a competitor from the field.

"The era of this method of doing business, I believe, has passed. It is not to anybody's advantage to injure a rival; on the contrary, everybody's efforts should tend toward a loyal understanding, which, by making transactions easier, would necessarily result in better production and cheaper prices.

"That American law does not allow agreements between competitors is the first reason why a friendly understanding should exist among all steel men and then to consider the best means to bring about improvements in manufacture, the betterment of the conditions of employees, standardization, etc., in a word, to study all means tending to the improvement of the steel business.

"This, it has been suggested, would mean ideal conditions. But why should we not let the ideal be our goal if a change meant general improvement? So far as the idea of establishing friendly relations among us all, it seems to appeal to everybody. Our daily intercourse at Brussels, in both business and recreation, could not have been more cordial, and there is no doubt that the conference is a long step toward the realization of what I should term a scheme for the adoption of ideal business methods."

Personal

O. H. Linton has resigned his position with the Niles-Bement-Pond Company, New York, and has become associated with Griggs & Holbrook, consulting engineers, 3 South William street, New York, and will have charge of their Canadian business, with headquarters at 23 Scott street, Toronto.

N. B. Ayers has resigned the position of chief engineer of the Dayton Power & Light Company and organized the Ayers Engineering Company to handle power plant engineering, with office in the Conover Building, Dayton, Ohio.

Fritz A. Lindberg, electrical and mechanical engineer, has been admitted to the firm of Brill & Gardner, the firm name, business and location of which will continue as heretofore at 1133 Marquette Building, Chicago. Mr. Lindberg is a graduate of the Armour Institute of Technology and has been associated with the office for some time.

Charles Edward Lucke and Fred Ophüls announce the opening of their office as consulting engineers, under the name of Lucke & Ophüls, 30 Church street, New York City. The intention is to give particular attention to refrigerating and ice-making apparatus as well as to the engineering of complete plants.

Frank J. Vinson, auditor of the Brown-Ketcham Iron Works, Indianapolis, Ind., was arrested July 10 charged with embezzlement. The shortage is said to be \$60,000.

J. W. Carrel, sales manager of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, has returned from a six months' business and pleasure trip through Europe.

Obituary

HENRY BOLLER PANCOAST, a well-known iron merchant of Philadelphia, Pa., died at his home in Cornwells, Pa., July 2, after an illness of several months, aged 68 years. He was born in Philadelphia, was graduated from Haverford College in 1863, and then entered the employ of Morris, Tasker & Co. In 1870 he formed a partnership with Francis I. Maule, under the name of Pancoast & Maule. In 1892 the style of the firm was changed by the retirement of Mr. Maule, the business being continued by Mr. Pancoast under the name of Henry B. Pancoast & Co., and in 1909 was incorporated as the Henry B. Pancoast Company, with Mr. Pancoast as president. He leaves a widow, two sons and three daughters.

FRANCIS SCHUMANN, for many years prominent in the foundry trade, died June 29, at his home in Germantown, Philadelphia, Pa., aged 67 years. Born in Thuringia, Saxony, Mr. Schumann came to this country when a young man. In 1887 he founded the Tacony Iron & Metal Company, Philadelphia, of which he was president for a number of years. Later he became connected as president and general manager with the Pennsylvania Iron Works Company. Some five years ago he suffered a stroke of paralysis and has not been actively engaged in business since; a recurring stroke caused his death. He was the first president of the Philadelphia Foundrymen's Association and also the first president of the American Foundrymen's Association, a past president of the Engineers' Club and a member of the Franklin Institute and of the American Society of Mechanical Engineers. He leaves a widow and a son.

CYRUS CHAMBERS, JR., president of the Chambers Brothers Company, Philadelphia, Pa., died July 9 at his home at Overbrook, Pa., aged 78 years. He was born in Kennett Square, Pa., and developed inventive talents at an early age. His most noted achievements were the invention of paper-folding and clay-working machinery. He was almost totally blind at the time of his death. He leaves a widow and three daughters.

HARRY F. FROHMAN, Cincinnati, Ohio, one of the best known men in the foundry trade, died suddenly July 5 from heat prostration, aged 43 years. He was born in Cincinnati, was graduated from the Hughes High School and started with the S. Obermayer Company, foundry supplies, in 1886. He attained the position of secretary and treasurer with the old company, and after its reorganization he was elected treasurer and general manager, hold-

ing this position from 1901 until he died. He was a member of the Cincinnati Business Men's Club and the Chamber of Commerce. He leaves a widow.

We have received a copy of the Far Eastern Review, a monthly review of Far Eastern trade, finance and engineering, published at Manila, P. E., and treating of matters in China, Manchuria, Japan, Indo-China, Siam, Straits Settlements, Malay States, Burma, India, Malaysia and the Philippines. Among the articles of interest may be mentioned that on the West Siberian Railway, with illustrations; a very full account of the Taal disaster—the eruption of the Taal volcano—with 16 illustrations, and an illustrated article, "The Maine: Thirteen Years After."

Henshaw, Bulkley & Co., San Francisco, who were adjudged insolvent several weeks ago, have filed their schedule of debts and assets, showing total liabilities \$429,967 and assets \$463,000. Of the liabilities \$101,354 are on notes and bills which other parties ought to pay, and do not represent debts of the firm other than as sureties. They have petitioned the court for appointment of a trustee, who will probably be named July 20.

Walter O. Amsler, Wabash Building, Pittsburgh, furnace engineer, has completed plans for the erection of a continuous heating furnace for the Seattle Steel Company, Seattle, Wash., manufacturer of merchant bars, etc. The furnace will have a capacity of eight tons of steel per hour and is similar to one in the plant of the Franklin Rolling Mill Company, Franklin, Pa., formerly used by M. Laughlin, general manager of the Seattle Steel Company.

The Clinton Iron & Steel Company, Pittsburgh, is making more extensive improvements in its blast furnace than stated last week. It is rebuilding the furnace, putting in new trestles, gas washer, and ore unloading machinery. All will be finished the latter part of September. The rebuilt furnace will have a capacity of over 350 tons per day, when running on foundry iron, and about 400 tons on Bessemer.

The Republic Iron & Steel Company put in operation July 10 its Atlantic blast furnace at New Castle, and is making preparations to blow in Hall furnace at Sharon, Pa.

Customs Decisions

Wire Bound Hose

The status of oil-resisting hose bound with wire is set forth in a decision made by the Board of United States General Appraisers in a test case brought by the Whitney Supply Company. The customs officials exacted duty at 45 per cent. ad valorem under the provision in the act of 1909 for manufactures in chief value of metal. The contention of the importer was for a rate of 30 per cent. under the paragraph in the law for flexible metal tubing or hose. In overruling the claim, the decision by General Appraiser Fischer says: "The proof offered in the case does not warrant a disturbance of the assessment in question. The only claim in the protest is that the hose is classifiable under the provision for flexible metal tubing or hose. It is clear that a cotton canvas hose bound with wire is not of that description. The protest is overruled, and the decision of the collector affirmed."

Wire Drawing Plates

The C. Newman Wire Company and others have succeeded in having the board reverse the customs authorities in their assessment of duty on wire drawing plates and wortles. Duty was assessed at the rate of 45 per cent. under the provision in the law for manufactures in chief value of metal. The claim made and sustained is that the goods are dutiable properly at 35 per cent. as forgings of steel.

Alcohol Smoothing Irons

In denying a contention raised by the Emery, Bird, Thayer Dry Goods Company, Kansas City, the board holds that self-heating alcohol smoothing irons are dutiable properly at the rate of 45 per cent. as manufacturers of metal and not at 8/10 of 1 cent a pound as "cast iron sadirons," as claimed by the importer.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

July 12, July 5, June 14, July 13,

1911. 1911. 1911. 1910.

PIG IRON, Per Gross Ton:

Foundry No. 2 standard, Philadelphia	\$15.00	\$15.00	\$15.00	\$16.25
Foundry No. 2, Valley furnace	13.50	13.50	13.50	14.25
Foundry No. 2 Southern, Cincinnati	13.25	13.25	13.50	14.75
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.25	11.50
Foundry No. 2, at furnace, Chicago*	15.00	15.00	15.00	16.50
Basic, delivered, eastern Pa.	14.25	14.50	14.50	15.75
Basic, Valley furnace	13.25	13.25	13.10	14.50
Bessemer, Pittsburgh	15.90	15.90	15.90	16.40
Gray forge, Pittsburgh	13.90	13.90	13.90	14.40
Lake Superior charcoal, Chicago	16.50	16.50	17.00	18.50

COKE, CONNELLSVILLE

Per Net Ton, at Oven:

Furnace coke, prompt shipment.	1.40	1.45	1.40	1.60
Furnace coke, future delivery..	1.55	1.60	1.60	1.80
Foundry coke, prompt shipment	1.80	1.85	1.75	2.15
Foundry coke, future delivery..	2.05	2.10	2.15	2.25

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	21.00	21.00	21.00	25.00
Forging billets, Pittsburgh	26.00	26.00	26.00	30.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	28.50
Wire rods, Pittsburgh	27.00	27.00	29.00	29.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.00	14.00	14.00	16.75
Iron rails, Philadelphia	16.75	16.50	16.50	19.00
Car wheels, Chicago	12.50	12.50	12.50	14.75
Car wheels, Philadelphia	12.75	13.00	13.00	14.50
Heavy steel scrap, Pittsburgh	13.00	13.00	12.75	14.50
Heavy steel scrap, Chicago	10.50	10.25	10.25	12.25
Heavy steel scrap, Philadelphia	13.00	13.00	13.00	14.25

FINISHED IRON AND STEEL

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.27 1/2	1.27 1/2	1.27 1/2	1.47 1/2
Common iron bars, Pittsburgh.	1.25	1.25	1.25	1.50
Common iron bars, Chicago	1.20	1.20	1.20	1.40
Steel bars, Pittsburgh	1.25	1.25	1.25	1.45
Steel bars, tidewater, New York	1.41	1.41	1.41	1.61
Tank plates, Pittsburgh	1.35	1.35	1.35	1.40
Tank plates, tidewater, New York	1.51	1.51	1.51	1.56
Beams, Pittsburgh	1.35	1.35	1.35	1.40
Beams, tidewater, New York	1.51	1.51	1.51	1.56
Angles, Pittsburgh	1.35	1.35	1.35	1.40
Angles, tidewater, New York	1.51	1.51	1.51	1.56
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.00	2.30
Wire nails, Pittsburgh	1.70	1.70	1.80	1.80
Cut nails, Pittsburgh	1.60	1.60	1.60	1.70
Bark wire, galv., Pittsburgh	2.00	2.00	2.10	2.10

METALS

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.87 1/2	12.75	12.62 1/2
Electrolytic copper, New York	12.55	12.62 1/2	12.50	12.37 1/2
Spelter, St. Louis	5.60	5.60	5.32 1/2	5.05
Spelter, New York	5.80	5.80	5.55	5.20
Lead, St. Louis	4.35	4.35	4.30	4.25
Lead, New York	4.51	4.50	4.45	4.40
Tin, New York	43.50	45.40	46.87 1/2	32.65
Antimony, Hallett, New York	8.12 1/2	8.12 1/2	8.75	8.12 1/2
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22 1/2c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 18 in., 1.50c. to 1.55c.,

angles, 3 to 6 in. inclusive, 1/4 in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than 1/4 in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; tees, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4 in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered 3/4 in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under 1/4 in. to and including 3-16 in. on thinnest edge, extra	\$0.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2 1/2 in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	.....	\$2.40	23	\$2.40	\$3.50
28	\$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

Wrought Pipe.—The following are the jobbers' car load discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1.

	Butt Weld.	Steel	Galv.	Iron	Galv.
	Black.	Galv.	Black.	Galv.	
1 to 1 1/2 in.	75	63	49	43	
1 1/2 in.	75	63	71	59	
3/4 to 1 1/2 in.	79	69	75	65	
2 to 3 in.	80	70	76	66	
	Lap Weld.				
2 in.	76	66	72	62	
2 1/2 to 4 in.	78	67	74	64	
4 1/2 to 6 in.	77	67	73	63	
7 to 12 in.	75	59	71	55	
13 to 15 in.	51 1/2	..	..	..

THE IRON AND METAL MARKETS

Butt Weld, extra strong, plain ends, card weight.			
1/2, 3/4, 1 in.	69	59	65
1 1/2 in.	74	68	70
2 to 3 in.	78	72	74
2 to 3 in.	79	73	75
Lap Weld, extra strong, plain ends, card weight.			
2 in.	75	69	71
2 1/2 to 4 in.	77	71	73
4 1/2 to 6 in.	76	70	72
7 to 8 in.	69	59	65
9 to 12 in.	64	54	60
Butt Weld, double extra strong, plain ends, card weight.			
1/2 in.	64	58	60
3/4 to 1 1/2 in.	67	61	63
2 to 3 in.	69	63	65
Lap Weld, double extra strong, plain ends, card weight.			
2 in.	65	59	61
2 1/2 to 4 in.	67	61	63
4 1/2 to 6 in.	66	60	62
7 to 8 in.	59	49	62
Plugged and Reamed.			
1 to 1 1/2, 2 to 3 in. Butt Weld.	will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe, Butt or lap weld, as specified.		
2, 2 1/2 to 4 in. Lap Weld			

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel-boiler tubes to jobbers in carloads are now as follows:

	Steel.
1 3/4 to 2 1/4 in.	65
2 1/2 in.	67 1/2
2 3/4 to 3 1/4 in.	70
3 1/2 to 4 1/2 in.	72 1/2
5 to 6 in.	65
7 to 13 in.	62 1/2

Less than carloads to destination east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.50, galvanized, \$1.80; carload lots, to retailers, annealed, \$1.55, galvanized, \$1.85. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails, to jobbers, \$1.70.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.									
No.	0 to 9	10	11	12 & 12½	13	14	15	16	
Annealed	\$.165	\$1.70	\$1.75	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20	\$2.20
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80	
Market and Stone Wire in Bundles, Discount from Standard List.									
Bright and Annealed:									
9 and coarser									.80
10 to 18								.80 and 10	
19 to 26							.80 and 10 and 2½		
27 to 36									.80 and 5
Galvanized:									
9 and coarser									.75 and 10
10 to 16									.75 and 10
17 to 26									.72½ and 10
27 to 36									.72½
Coppered or Liquor Finished:									
9 and coarser									.75 and 10
10 to 26									.75 and 10
27 to 36									.70 and 10 and 5
Tinned:									
6 to 18									.75 and 10 and 10

Pittsburgh

PITTSBURGH, PA., June 12, 1911.—(By Telephone.)

Pig Iron.—In basic pig iron the market continues to reflect the higher price of \$13.25 at Valley furnace quoted last week. There is tentative inquiry for about 60,000 tons, but some of this is not very serious. The most likely inquiry is for 6000 tons for a steel works on the Ohio River in the immediate Pittsburgh district for delivery over the last five months of the year. Considerable uncertainty exists as to what price would be done on a large block of basic, but no quotations are being made at less than \$13.25, Valley furnace, and we note sales in the past few days of 150 tons for prompt delivery on this basis, the delivered price, Pittsburgh, being \$14.15. Bessemer iron is firmer since the sales recently reported of odd lots at concessions, and we note a few sales of one carload each this week at \$15, Valley furnace. The Westinghouse Electric & Mfg. Company is inquiring for a supply of foundry iron for its Allegheny and Cleveland works for the seven months of September to March inclusive. We quote as follows: Bessemer pig iron, nominally, \$15; malleable Bessemer, \$13.50; basic, \$13.25; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace, the freight rate to Pittsburgh being 90c. per ton.

Steel.—Specifications on sheet-bar contracts for de-

livery this month are slightly greater than those for last month, which month showed an improvement over May. Billet specifications are fairly good. Very little business is being done in the open market, consumers being well covered by contracts. Since the furnaces have been quoting higher prices on basic pig iron it has been difficult for middlemen to put through conversion deals. We quote Bessemer and open-hearth billets, 4 x 4 in., and up to but not including 10 x 10 in., \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1 1/2-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

(By Mail.)

While the flow of orders for finished steel products is not altogether as large thus far this month as the average for June, it is in excess of the average for May, and this, considering the season of the year, with a number of plants closed for inventory and repairs and many men away on vacations, is regarded as very favorable. One of the largest steel interests reports that its bookings last week exceeded its shipments by a very considerable margin, and the holiday is believed to have affected orders more than shipments, so that the showing is an excellent one. The steel mills are operating at practically as good a gait as in June, or on an average at between 70 and 75 per cent. of capacity. The recent activity has occurred with practically no assistance at all from the railroads, and this scattered buying is expected to continue, while the railroads are regarded as certain to be much larger buyers in the next few months than they have been lately. Active inquiry for cars totals up about 15,000, from over half a dozen different systems. This includes some 3800 cars for the Erie Railroad, bids on which were opened last Saturday, but awards have not yet been announced. It is believed that all the business will be closed by about August 1, and that if freight tonnage increases the same roads that are buying now will have to buy again. The Pennsylvania, for instance, is understood to have 4500 vacant numbers, but is figuring on buying only 2000 or 3000 cars at present, and it is likely therefore to be a purchaser later. Altogether the outlook is for a moderate degree of activity in the next few weeks, with a decided improvement thereafter, making the second half of this year much better than the first half has proved to be. Prices of semifinished and finished steel are being well maintained all along the line.

Ferromanganese.—The market is quiet, but considerable business is in sight for the second half. We continue to quote prompt and forward at \$36.50, Baltimore, freight to Pittsburgh being \$1.95.

Ferrosilicon.—There is no important inquiry in the market, and sales have been very light. We quote 50 per cent. at \$51.50 to \$52, Pittsburgh, for delivery over second half of the year; 10 per cent. blast furnace ferrosilicon, \$22; 11 per cent., \$24 and 12 per cent. \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—Nothing new is reported in muck bar since the sale mentioned in last report of 500 tons for July at about \$28.50, delivered Pittsburgh. We quote best grades of all-pig muck bar at \$28.50 to \$29, one or two makers refusing to name less than the higher price.

Skelp.—As a number of skelp consumers are closed for the fortnight for inventory and repairs, deliveries are somewhat reduced and the market is quiet. We quote grooved steel skelp at 1.25c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.50c. to 1.60c. and sheared iron skelp 1.70c. to 1.75c. usual terms, all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—Rod contracts being adjusted to the reduced price on wire rods named last month, specifications have been somewhat improved. We quote Bessemer, open-hearth and chain rods at \$27, Pittsburgh.

Steel Rails.—The Edgar Thomson rail plant is running at about two-thirds full capacity, about half the output being rail for export. The Ohio plant, which was recently put on open-hearth rails to fill an order for 7500 tons for export, is back to billets and sheet bars, but will be put on open-hearth rails from time to time as occasion requires. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c. and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market in carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c per pound for Bessemer.

THE IRON AND METAL MARKETS

Structural Material.—Specifications are coming in freely, and the structural mills are running as well as last month, but no important contracts are reported closed in the past few days. We quote beams and channels up to 15-in. at 1.35c, Pittsburgh.

Plates.—The Carnegie Steel Company is reported to have received 4500 tons of plates from the Treadwell Construction Company for the Los Angeles aqueduct. As noted before, there is inquiry for a total of about 15,000 steel cars, likely to be placed by about August 1, including 3800 cars for the Erie Railroad, bids upon which were opened Saturday. There is a good run of specifications coming in to the mills, on orders placed last month. We quote plates, 1/4-in. and heavier, at 1.35c, Pittsburgh.

Sheets.—Buying of sheets is somewhat lighter than in June, but as a considerable part of the June buying was for forward delivery the mills have a little accumulation of business for this month and are able to run as well as formerly—about 65 per cent. of full capacity in the case of both American Sheet & Tin Plate Company and the independents. In a few cases mills have closed for repairs for the first fortnight of the month. Regular prices on black, galvanized and roofing sheets, as given on a previous page, are strictly maintained.

Tin Plate.—The largest independent tin plate mill was closed last week and is closed this week also, for much-needed repairs. Two or three other plants are closed or running light in order to make repairs, for which this time is regarded as especially propitious, as with the hot weather the output would be reduced. The tin plate mills as a whole are this week making an output of 65 to 70 per cent. of full capacity. A good line of specifications is on the books, and this rate of production is expected to be maintained without difficulty until the middle or latter part of August. We quote 100-lb. cokes, 14 x 20, at \$3.70, Pittsburgh.

Bars.—The remainder of the implement trade in steel bars will likely be closed this month, the great bulk of the business having been placed under contract already. Tonnages have not run as heavy as in the best years, the implement makers having considerable stocks of finished implements. On Friday last, at Cambridge Springs, Fla., at the close of a two days' conference, the Western Bar Iron Association signed the Amalgamated Association scale for the year beginning July 1, the scale adopted being practically the same as that already accepted by the Republic Iron & Steel Company and containing no important changes from the previous scale. Some of the bar iron mills have closed for repairs, but will probably start before the end of the month. We quote steel bars at 1.25c. and common iron bars at 1.25c. to 1.30c., Pittsburgh.

Merchant Pipe.—Merchant pipe is rather quiet both as to specifications and new business, and mills are not running as full this month as last. The Ohio Fuel Supply Company has placed a contract for 25 miles of 16-in., the market otherwise being very quiet in line pipe. The A. M. Byers Company, whose large iron pipe plant at Girard, Ohio, has been idle for repairs the past fortnight, this week started one of the two puddle mills, containing 42 furnaces. Regular discounts in effect on iron and steel pipe are given on a previous page.

Rivets.—The market on rivets is quite active, there having been good buying in the second half of June and specifications are coming in rather freely. We quote structural rivets at 1.70c. to 1.75c. and boiler rivets at 1.80c. to 1.85c., these prices being shaded only on the most desirable orders.

Wire Products.—No improvement has occurred in the wire trade since the price reductions of May 29 and mills are running quite slack, but it is believed that a good foundation has been laid for the fall trade and that orders and specifications will show marked improvement some time next month or early in September. We quote galvanized barb wire at \$2 per 100 lbs., painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, about \$1.60, f.o.b. Pittsburgh, full freight added to point of delivery. The quotation of \$1.60 on cut nails might be shaded on a desirable order.

Shafting.—Buying at present is only of a hand-to-mouth character and shipments are relatively light, but good buying is expected soon from the agricultural implement trade. Regular discounts on shafting remain at 60 per cent. off in carload lots and 55 per cent. in less than carloads, delivered in base territory, but on desirable orders these discounts are being shaded somewhat.

Spelter.—The market has continued to decline and

this has brought out more inquiry and somewhat more buying. We note sales of two carloads of prime Western to-day at 5.67 1/2c., delivered. Pittsburgh district, equal to 5.55c. East St. Louis, and quote the market at this, 5.70c. Pittsburgh being asked by some sellers. Some prospective buyers are waiting to see if the market declines further.

Hoops and Bands.—Specifications are coming in well on orders placed in June, and the mills are running at a comfortable gait, but purchases are confined to immediate requirements. We quote hoops at 1.40c. and bands at 1.25c., extras on the later as per the steel bar card.

Merchant Steel.—Orders and specifications are a little better than at this time last month. Regular quotations which, however, are being shaded, are: Iron finished tire, 1/2 x 1/2 in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Boiler Tubes.—The market continues dull, with mills running at an unsatisfactory gait and regular discounts being regularly shaded.

Iron and Steel Scrap.—The embargo on scrap shipments to Monessen has been lifted, but the refusal of a steel mill down the Ohio River to take additional deliveries continues. There is little opportunity to sell scrap to the mills, as the open-hearth plants are well provided and most of the iron mills have closed for repairs and inventory. Quotable prices are unchanged, as follows, per gross ton, f.o.b. Pittsburgh:

Heavy steel scrap	Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	\$13.00 to \$13.25
No. 1 foundry cast	.....	13.25 to 13.50
No. 2 foundry cast	.....	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	.....	10.75 to 11.00
Rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	.....	13.50 to 13.75
No. 1 railroad malleable stock	.....	12.00 to 12.25
Grate bars	.....	10.50 to 10.75
Low phosphorus melting stock	.....	16.00 to 16.25
Iron car axles	.....	23.75 to 24.00
Steel car axles	.....	18.50 to 18.75
Locomotive axles	.....	23.00
No. 1 busheling scrap	.....	12.00 to 12.25
No. 2 busheling scrap	.....	8.50 to 8.75
Old car wheels	.....	13.50 to 13.75
Sheet bar crop ends	.....	15.50 to 15.75
Cast iron borings	.....	8.75 to 9.00
Machine shop turnings	.....	9.00 to 9.25
Old iron rails	.....	15.00 to 15.25
No. 1 wrought scrap	.....	14.25 to 14.50
Heavy steel axle turnings	.....	10.00 to 10.25
Stove plate	.....	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

CHICAGO, July 12, 1911.—(By Telegraph.)

During the month of June progress of a sustained and satisfying character was made in increasing the volume of mill tonnage. Thus far in July this has been practically continued, giving rise to what is now a general feeling that the ensuing 90 days will witness a steady gain in business. The indications are that the local rail mills feel assured of a desirable rail tonnage for the last half and already the specifications by the railroads against their structural contracts have been sufficiently liberal to place the mills in a much improved position. The steel bar situation has been so far cleared up by the contracting of the larger interests and by the signing of last year's scale by the Western Bar Iron Association that weakness in the 1.25c. price has apparently been quite eliminated. The past week brought out the largest aggregate tonnage of fabricating contracts recorded for several months. Bar iron mills in this market resumed operations this week with the heaviest bookings of a year past. While that turn in sentiment which presages advancing prices does not seem imminent, the market tone has grown sufficiently stronger to make any lower prices very unlikely.

Pig Iron.—When pig iron prices are as low as they are at present, there is always the possibility that a rising market may be quickly inaugurated. Particularly does the melter of iron have this in mind when improvement is being reported in other directions. It is natural, therefore, that buyers are now watching the situation closely and are sending their inquiries into the market freely, although they do not wish to buy if prices will remain as they are indefinitely. The immediate situation presents no reason why it is better to buy for the last half now than a month from now.

THE IRON AND METAL MARKETS

There are even some indications that a fortunate buyer may later at an opportune moment be able to shade the current quotations. At the same time, it is to be remembered that the present price of \$10, Birmingham, for Southern No. 2 foundry and \$15, Chicago, for Northern iron are certainly favorable to the melter at any time. A survey of the situation would seem to indicate that the buyer requiring a moderate tonnage can scarcely go wrong on the present basis. The heavy melter may find the bottom and then the low price furnaces will be out of the market except at an advance. Only a moderate tonnage of iron is now being bought, sufficient to cover current needs and feel the market. We continue to quote for Chicago delivery, with the exception of local irons, which are f.o.b. furnace, the following prices:

Lake Superior charcoal.....	\$16.50 to \$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	14.85 to 15.10
Southern coke, No. 2 foundry and No. 2 soft.....	14.35 to 14.60
Southern coke, No. 3.....	14.10 to 14.35
Southern coke, No. 4.....	13.85 to 14.10
Southern gray forge.....	13.60 to 13.85
Southern mottled.....	13.60 to 13.85
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.50
Jackson Co. and Kentucky silvery, 6 per cent.....	17.90
Jackson Co. and Kentucky silvery, 8 per cent.....	18.90
Jackson Co. and Kentucky silvery, 10 per cent.....	19.90

(By Mail.)

Rails and Track Supplies.—Indications are that negotiations are pending with the local mills, involving substantial tonnages of rails. It has been known that some of the Western and Northwestern roads have had the buying of rails under consideration and the attitude of the leading interest is indicative of developments in this direction. Among the rail orders recently placed are 1500 tons for the St. Joseph Valley Traction Company and 500 tons for the Illinois Traction Company. The Iowa Central Railroad bought about 4000 tons and a local terminal belt line took approximately 2000 tons. In addition miscellaneous orders aggregated close to 5000 tons. It is understood that a considerable tonnage of rails for export has been placed with the local mills. Rail orders have carried a good proportion of frogs, switches and cross-overs. Orders for track fastenings are likewise active. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago; Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.10½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c., Chicago.

Structural Material.—From the standpoint of mill bookings and fabricators' contracts as well, the past week has shown structural material to be one of the most active features of the market. Railroads are specifying quite freely against their bridge structural contracts. Car and locomotive orders show a gain. Building and bridge structural contracts placed during the week totaled over 20,000 tons. Some of the items reported are as follows: Rand-McNally building, Chicago, 6865 tons to the Vierling Steel Works, Chicago; Van Nuys building, Los Angeles, Cal., 3435 tons, to the Llewellyn Iron Works; steel tanks and mills for the Tonopah-Belmont Development Company, Tonopah, Nev., 1100 tons, to the Worden-Allen Company Milwaukee; Multnomah County court house, Portland, Ore., 1470 tons, to Milliken Bros.; Masonic Temple, San Francisco, 2035 tons, to the American Bridge Company; bascule bridge near San Pedro, Cal., 1310 tons, to the King Bridge Company, Cleveland, by the Southern Pacific. The Minneapolis, St. Paul & Sault Ste. Marie contracted with the Pennsylvania Steel Company for 2855 tons of bridge steel; the Chicago & Alton ordered from the Toledo Bridge & Crane Company 400 tons of deck girders, and the Northern Pacific will have 675 tons of steel center sills built by the Pressed Steel Car Company. Among the smaller orders placed were 115 tons for a bridge at Mt. Vernon, Wash.; 335 tons, to Heil & Co., Milwaukee, for the Boston store in that city; 300 tons for the Pantages Theater, to the Central Iron Works, San Francisco; 295 tons of trestle steel for the Pacific Portland Cement Company at Cement, Cal., to the American Bridge Company, and 120 tons of pole fixtures for the Olympic Power Company, Port Angeles, Wash., to the Hubbard Company. We quote plain material from mill at 1.53c. to 1.58c. and from store 1.75c., Chicago.

Plates.—Western steel car plants have up to this time found business very dull. There is now, however, some demand for plates both from the Hammond and Hegewisch plants. General specifications for plate tonnage are very satisfactory. Chicago quotations for mill shipment are 1.53c. and from store, 1.75c.

Sheets.—The increase in the sale of galvanized sheets as compared with black sheets is an interesting tendency in favor of the more expensive but better protected material. Prices are reported as being maintained uniformly. While there is no buying far into the future, and probably will not be until the mills definitely advise the trade of advances in prices, the tonnage being placed for immediate requirements and for delivery through the remainder of the year has grown to be satisfactory from the mill standpoint. An order for 500 tons placed for forward delivery represents a good contract in the present market situation. Chicago prices on sheets are as follows: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—The departures from the price of 1.25c., Pittsburgh, for steel bars which were reported in connection with the placing of some of the large Western bar contracts, seem to have quite disappeared now that the most of that business has been placed. Current steel bar business shows improvement and the local bar iron mills are comparatively very active after the shutdown of last week. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Wire Products.—Some interest is being displayed in fall contracts for wire nails and barb wire and, as merchants' stocks are low, fair business is expected to result. Rather more liberal contracting is observed in connection with fence wire on the part of manufacturers, although held in check somewhat by the uncertainty of the crop situation. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Old Material.—Some response to the greater activity in bar iron and finished steel lines has been felt in the scrap market and a better tone prevails. The local mills are taking material in small quantities only and there is still little opportunity for active trading. The Chicago & Alton Railroad is offering about 200 tons of rerolling rails, the Soo line has about 500 tons of mixed scrap to dispose of, and the Baltimore & Ohio has issued a list totaling in the neighborhood of 10,000 tons, but most of this will probably be marketed in the East. Prices are about the same, there being some variation depending upon the character and quantity of the material sold. We quote below for delivery to buyer's works, all freight and transfer charges paid per gross ton:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	12.25 to 12.50
Old steel rails, less than 3 ft.....	11.00 to 11.50
Relaying rails, standard sections, subject to inspection.....	24.00
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.50 to 11.00
Frogs, switches and guards, cut apart.....	10.50 to 11.00
Shoveling steel.....	10.00 to 10.50
Steel axle turnings.....	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars.....	\$12.50 to \$13.00
Iron arch bars and transoms.....	13.75 to 14.25
Steel angle bars.....	10.25 to 10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.25
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	9.25 to 9.75
Locomotive tires, smooth.....	16.00 to 16.50
Machine shop turnings.....	6.25 to 6.75
Cast and mixed borings.....	5.25 to 5.75
No. 1 busheling.....	8.75 to 9.25
No. 2 busheling.....	6.75 to 7.25
No. 1 boilers, cut to sheets and rings.....	7.50 to 8.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.25 to 10.75
Stove plate and light cast scrap.....	9.00 to 9.50
Railroad malleable.....	10.00 to 10.50
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.00 to 8.50

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company secured 350 tons for Los Angeles, Cal. A letting of 300 tons at Santa Barbara, Cal., is also reported. Scattering business in pipe is reported as being maintained in good volume. We continue to

THE IRON AND METAL MARKETS

quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, July 11, 1911.

A more cheerful tone is apparent in nearly all branches of the trade, which has been substantiated in a certain degree by continued buying in crude and finished materials. A better movement in pig iron, both in steel making and foundry grades, is reported, and it is believed that this branch of the trade is now practically on a normal buying basis. The Eastern Pig Iron Association, which met last week, reports a sharp decline in stocks on furnace banks during June, greater than in any one previous month this year. The present productive rate in this district is now believed to be under the current consumption. The movement in finished materials since the holiday measures up to the demand previous to the first of the month and in instances a slight increase is reported. Mills have resumed operations at about the same basis as prior to the holiday suspension, and in the majority of instances order books are in somewhat better shape. Structural material continues active, and a better demand for steel billets is reported. Considerable business is pending in heavy plates. Bars, however, remain quiet. The old material market is stronger on scattered buying.

Iron Ore.—Negotiations are still pending for a large block of Swedish ore; purchases of cargo lots are also being considered by several Eastern consumers. The domestic ore situation is quiet. Importations during the week ending July 8 include 4675 tons of Cuban, 12,500 tons of Newfoundland, 6394 tons of Swedish and 5533 tons of Spanish ore.

Ferromanganese.—There is still an entire absence of demand in this district. Prices are nominally quoted at \$36.50, Baltimore.

Billets.—The demand has been somewhat broader. A moderate volume of small orders for early delivery is coming out and consumers are more disposed to contract, one order recently placed being for 1000 tons of rolling billets for delivery over the next three months. Forging billets also show a tendency to become more active. Recent quotations are firmly maintained, \$23.40 being named for rolling billets and \$28.40 for ordinary forging steel, delivered in this territory.

Plates.—Aggregate orders received during the past week measure up very favorably with those taken prior to the holiday. The greater part of the business placed has been in small lots, showing a continued activity on the part of the general trade. Some very satisfactory business in structural, boat and locomotive steel is pending and the trade looks for a moderate increase in the demand in the near future. Prices are unchanged, 1.50c. minimum being named for ordinary plates delivered in buyers' yards in this vicinity.

Pig Iron.—The market appears just a trifle broader. In several instances pending negotiations have been closed and consumers appear to be making their purchases on a more even basis. A price level has apparently been established in a majority of the grades at which buyers are willing to take care of their regular requirements without much shopping around, which brings the business on a more normal basis. Current quotations are unchanged. One of the leading interests in this district, which for a month past has been a most aggressive seller, now has its product for the next four months practically contracted for and has decided on a more conservative policy. Stocks on merchant furnace banks are smaller and do not show any indication of increasing. One furnace, Robeson, in the Lebanon Valley, was blown out this week, while preparations to blow in the No. 2 furnace of the Warwick Iron & Steel Company are being made, and this stack is expected to be making iron by August 1. A better movement in both foundry and steel making grades has been reported. One block of 5000 tons of basic was taken by an Eastern steel mill for prompt shipment at \$14.25, delivered, while a sale of 7500 tons, shipment in equal portions during the last five months of the year, was made to a central Pennsylvania melter at \$15, delivered. One block of about 5000 tons for August-September delivery is before the trade. Transactions in low phosphorus iron have been unimportant. In foundry iron the most active movement has been in the pipe making grades. One Delaware River melter has been inquiring for a lot of 6000 tons, while another has been making purchases against a recent inquiry for 5000 tons, one sale of 2000 tons of off basic for August-September delivery at a price between \$14.25 and \$14.50 being re-

ported. In the higher foundry grades the quantities taken have, as a rule, been smaller, ranging from carloads to lots of a few hundred tons, for near future to extended delivery. Standard brands of eastern Pennsylvania No. 2 X foundry are pretty generally maintained at \$15 minimum, delivered here, although reports are occasionally heard that small concessions are made in competition, but lack confirmation, and it is believed that with low-priced sellers sold up the tendency to shade prices will disappear. There has been little movement in Virginia foundry grades. Small sales are reported at unchanged prices, although lower quotations are said to have been named by one producer for iron of special analysis. The sale of a block of 1000 tons of coke malleable, for delivery over the last half to a consumer in this district, is reported. The demand for forge iron for mill purposes continues quiet and prices are nominally quoted at \$14, furnace. The following range of quotations is named for standard brands, delivered in buyers' yards in this district during the third quarter and, in instances, the second half of the year:

Eastern Pennsylvania No. 2 X foundry.....	\$15.00 to \$15.25
Eastern Pennsylvania No. 2 plain.....	14.75 to 15.00
Virginia foundry	15.05 to 15.50
Gray forge	14.50
Basic	14.25 to 15.00
Standard low phosphorus.....	20.50 to 20.75

Structural Material.—Current orders for plain shapes have been fully up to the volume prior to the holiday, but there has been less new business offered in this immediate district in the way of fabricated material. The smaller fabricators are not bidding very extensively on anything but small jobs, as the larger projects usually go to the larger concerns on a price basis, and until they get filled up little betterment in fabricated prices is anticipated. The steel work for the new high school in West Philadelphia will be subject to re-estimation, as the contract for the construction under revised specifications has just been given to Cramp & Co., contractors. Some moderate bridge business is being figured on and the trade anticipates continued active conditions. Prices for plain shapes are firmly held at 1.50c., delivered here.

Sheets.—Mills in this district have resumed operations at practically full capacity. A considerable amount of business accumulated during the suspension last week and buyers are urging shipments. There has been little forward business placed, makers not being anxious for such orders at current prices. Individual orders, however, are reported as being larger in size. Sheet mills are encouraged with present conditions and look forward to a period of continued activity. Prices are firm, the following range, f.o.b. Eastern maker's mill, being named: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 to 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—The market still lacks strength. Small lot buying in refined iron bars continues and no difficulty is experienced in obtaining the recent minimum, 1.20c., mill, for the general run of business. No inquiries of sufficient size to thoroughly test the market have been reported. A moderate business in steel bars is reported at 1.40c., delivered here. Refined iron bars continue to be quoted at 1.27½c. to 1.32½c., delivered in this vicinity.

Coke.—A very fair demand for both furnace and foundry coke is reported and there seems to be a tendency on the part of sellers to stiffen up prices, particularly in cases where extremely low prices have recently been named. Some further business has been closed against recent inquiries for large blocks of furnace coke. Further sales of prompt coke are also reported. In foundry coke contracts in lots covering upward of 1000 tons are reported at prices ranging from \$2 to \$2.30, at oven. The following range of prices, per net ton, is named for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$3.65 to \$4.00
Foundry coke	4.10 to 4.55
Mountain furnace coke.....	3.25 to 3.60
Foundry coke	3.70 to 4.15

Old Material.—While purchases have not been numerous or involved any large quantities, the tone of the market is firmer and it is believed that prices are strictly at the bottom and that any movement must be upward. Consumers are showing more interest in the market and in several instances prices are slightly higher. Heavy melting steel shows a somewhat wider range; odd lots can still be had at \$13, delivered, but \$13.25 is offered for strictly No. 1 material and \$13.50

THE IRON AND METAL MARKETS

would be necessary to bring out any quantity. Wrought iron pipe has also been in more active demand. No. 1 railroad wrought is stronger and borings have been in better demand. Stove plate has also been more active. The recent offerings of 1000 tons of Panama scrap, for which bids were opened yesterday, will, no doubt, go to the Alan Wood Iron & Steel Company, which was the high bidder at \$11.13. Considerable criticism is heard on the new plan of bidding for the Panama scrap as now outlined by the Isthmian Canal Commission, which will receive proposals on September 5 for the purchase of the "French scrap" in the Canal Zone, Panama. The plan is to sell the material as it lies, the purchaser to bear all expense of breaking up, hauling, removing and transporting. Bids are to be in a lump sum for the entire amount of scrap, and three years will be allowed for the removal of the material. The following quotations, while still to a certain extent nominal, represent about the market for early deliveries in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.50
Old steel rails, rerolling (nominal).....	14.00 to 14.50
Low phosphorus heavy melting steel scrap.....	16.75 to 17.25
Old steel axles (nominal).....	19.25 to 19.75
Old iron axles.....	24.00 to 24.50
Old iron rails.....	16.75 to 17.25
Old car wheels.....	12.75 to 13.25
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron (nominal).....	6.75 to 7.25
Wrought turnings.....	8.75 to 9.25
Cast borings.....	8.50 to 9.00
Machinery cast.....	13.00 to 13.50
Railroad malleable (nominal).....	11.50 to 12.00
Grate bars, railroad.....	10.00 to 10.50
Stove plate.....	10.00 to 10.50

Cincinnati

CINCINNATI, OHIO, July 11, 1911.—(By Telegraph.)

Pig Iron.—No decided change toward activity has taken place, but there is an improved feeling that is partially supported by the number of inquiries coming in and by the sale of a few medium-sized lots of iron for last half delivery. The larger consumers are watching the situation closely and at the first sign of any advance in present price will doubtless enter the market. It is understood that the foundries in this territory are covered for the third quarter and a majority of them have enough iron to last throughout the year. Among inquiries is one from a southern Ohio manufacturer for 600 tons each of Southern and Northern iron, averaging 2.25 to 2.50 in silicon, and about 900 tons of Northern foundry iron with silicon analyzing 1.25 to 1.60. A northern Indiana melter wants 2000 tons of foundry and malleable, and in Michigan is a prospective customer for 1000 tons of malleable. There are a number of small inquiries before the trade, but a large proportion of these is probably from consumers who are already stocked up and are merely testing the market. Two Indiana melters bought 500 and 1000 tons of Northern No. 2 foundry around \$13 at furnace. A southern Ohio consumer took 800 tons of Southern No. 2 foundry at \$10, Birmingham. Several small sales of Southern iron have been made, and \$10 is the recognized price for delivery during the remainder of the year. A southern Ohio manufacturer is reported to have purchased a round lot of Northern basic at the regular market price. Based on freight rates at \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$13.75 to \$14.00
Southern coke, No. 2 foundry and 2 soft.....	13.25 to 13.50
Southern coke, No. 3 foundry.....	12.75 to 13.00
Southern coke, No. 4 foundry.....	12.50 to 12.75
Southern gray forge.....	12.50 to 12.75
Ohio silvery, 8 per cent. silicon.....	16.95 to 17.20
Lake Superior coke, No. 1.....	14.70 to 14.95
Lake Superior coke, No. 2.....	14.20 to 14.45
Lake Superior coke, No. 3.....	13.70 to 13.95
Basic, Northern.....	14.45 to 14.70
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	19.00

(By Mail.)

Coke.—A central Western consumer has signed a 12 months' contract covering a daily supply of 50 to 100 tons of Pocahontas furnace coke. There is also some straggling contracting in foundry coke. It is reported that Eastern interests have done some heavy buying of furnace coke, but this has not been confirmed. Prices are stationary in all three fields, and we quote per net ton at oven, as follows: For prompt shipment 48-hr. coke \$1.40 to \$1.55, with the proba-

bility that last half business would be accepted at the latter figure, with a premium of a few cents to cover a year's supply. Foundry coke is not in much demand around \$2 for prompt shipment, but contracts for future requirements are made all the way from \$2.10 to \$2.35.

Finished Material.—Specifications on sheets are coming in freely; especially from jobbers, who are taking advantage of present quotations to stock up. The jobbers are also getting a good business from their customers. The mills rolling sheets in this section of the Middle West have all closed down for the usual midsummer repairs. Prices on sheets are unchanged and the regular quotations based on Pittsburgh delivery govern in all contracts made. Steel bars and structural material hold up well, and local warehouse prices are 1.70c. per lb. for steel bars and 1.80c. for structural material. Hoops and bands show some improvement, so far as the inquiry is concerned, but actual business booked is about the same as during nearby previous weeks. Railroad track material is moving better.

Old Material.—The midsummer holiday season, that includes the shutting down of the rolling mills for usual repairs, has contributed to the present dullness in the scrap market. A number of the foundries are covered for a future supply, and there are no indications of any change either in the demand, or in present quotations. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows.

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Casting borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.00
Burnt scrap, net ton.....	6.50 to 7.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, July 11, 1911.

Iron Ore.—Practically no sales are being made and there is very little inquiry. Sellers are looking for some activity next month as some furnace interests will need ore but have announced that they will not place their orders until the latter part of the season. The amount of buying will depend considerably on the condition of the pig iron market during the next few weeks. Conditions in the lake trade show some improvement over June. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Coke.—The recent buying movement of foundry grades for the last half has subsided, a large percentage of consumers in this territory not yet having covered for their requirements for the remainder of the year. Some of these do not appear disposed to make contracts but are buying small lots as they need it. There is no activity in furnace grades. We quote standard Connellsville furnace coke at \$1.45 to \$1.50, per net ton at oven for spot shipment, and \$1.60 to \$1.70 for the last half. Connellsville 72-hr. foundry coke is quoted at \$1.75 to \$2.15 for spot shipment and \$2.15 to \$2.40 for the last half.

Pig Iron.—Local selling agencies report a moderate demand from outside this territory from small consumers in lots of 400 tons and under. In this immediate territory the market is quiet, sales being limited mostly to lots of 200 tons and under. Some consumers seem to think that prices may go lower and are buying only a few weeks' supply instead of covering for their last half requirements. The only foundry iron inquiry for a round tonnage is from the Westinghouse Electric & Mfg. Company; an unspecified tonnage for its Cleveland and Pittsburgh plants for delivery during the last four months of 1910 and the first three months of next year. This inquiry is for No. 1, 2 and 3 iron. It is understood that the amount that will be purchased will depend on the price. Sellers who quote on the inquiry for the first quarter of next year state that they will ask about 50c. a ton over their last half quotations. The southern Ohio steel interest that had an inquiry out for basic is understood to have closed during the week for considerable tonnage, none of this business going to Cleveland interests. A new inquiry is for 1000 tons of malleable iron for the last half. Cleveland furnaces that have maintained for some time the price on foundry

THE IRON AND METAL MARKETS

iron for Cleveland delivery at \$14.25, delivered, for No. 2, have all reduced their price 25c. a ton, one seller first making the reduction and the others meeting the price. For outside shipment No. 2 foundry is quoted at \$13.50, at furnace, which is now pretty well established as the Valley price. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Basic	14.00
Northern foundry, No. 2	14.00
Gray forge	13.25
Southern foundry, No. 2	\$14.35 to 14.60
Jackson Co. silvery, 8 per cent. silicon	17.50 to 17.75

Finished Iron and Steel.—The recent improvement in the demand for all finished lines is maintained in spite of the fact that the intensely hot weather during the past few days has interfered somewhat with business and some buyers are holding off until their inventories are finished. Orders are quite numerous but they are mostly for small lots. The aggregate tonnage is quite satisfactory. General reports from consumers indicate some improvement in their orders. Some of the implement manufacturers have started up their plants at full capacity with a satisfactory volume of contracts on hand and good specifications for steel bars are coming from this source. Local bolt and nut makers, whose business has been light for some time, report a marked improvement in inquiries. The bulk of the steel bar consumers in this territory are now under contract, although a few are still holding out for lower prices. The steel bar market is now firm, with little, if any, price shading. The demand for structural material is fairly active and some new building work is coming out, requiring lots of around 200 tons or under. Bids for the 2000 tons of steel for the new city hall in Cleveland will be received July 18. The city will also be in the market shortly for a large tonnage for rebuilding the Central viaduct. The Pennsylvania Railroad is advertising for bids for foundation work in connection with a large amount of grade crossing elimination work in Cleveland, and is expected to be in market for a considerable tonnage of steel shortly. The demand for iron bars continues light. We quote iron bars at 1.25c. to 1.30c., Cleveland. The city of Cleveland has awarded the contract for 3600 tons of cast iron pipe for the water works department to the United States Cast Iron Pipe & Foundry Company at \$23.85 delivered mostly in 12 to 24-in. sizes. The same bidder has been awarded the contract for 945 tons of cast iron pipe for the city of Columbus, Ohio, at \$24 per ton. The contract for 230 tons of special castings for the Cleveland water works department was given to the Bowler Foundry, Cleveland.

Old Material.—The market is firmer with a better feeling among dealers than for some time. A local steel mill purchased during the week several thousand tons of scrap for delivery until October 1. Most of this was heavy steel scrap, for which the consumer paid \$11.50 to \$12. Some new inquiry for heavy steel scrap has also come from the Pittsburgh district. Local bar iron mills are closed down and are taking no scrap. Dealers have advanced prices 25c. a ton on heavy steel scrap and from 25c. to 50c. a ton on a few other grades. The Pennsylvania Railroad received bids July 11 on a large tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.75 to 12.25
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.75 to 11.00
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap	8.50 to 9.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$21.00 to \$21.50
Cast borings	6.50 to 6.75
Iron and steel turnings and drillings	6.75 to 7.00
Steel axle turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

St. Louis

St. Louis, Mo., July 10, 1911.

The improvement in the market continues to manifest itself. Prices that would have been accepted two weeks ago are flatly declined, while inquiries are more numerous and more insistent. Dealers are refusing to consider first half 1912 business on the present basis, and even last quarter business is not desired. Not the

least interesting feature of the situation is the encouragement received by the agricultural implement houses, which through their representatives have learned that the reports of crops damage have been much exaggerated as a whole, while recent rains have repaired much of the loss in this district.

Pig Iron.—The status of the pig iron market may best be realized from the fact that where a week or 10 days ago \$10 would have been accepted for No. 2 Southern, offers in quantity of \$10.25 have been refused by the sellers, who, moreover, are not particularly inclined to consider business beyond the present quarter at existing prices. Another interesting development is a shortage in this market of low grade iron, especially No. 4, of which not enough could be found the past week to make a quotation on an inquiry received. Still another encouraging feature is the fact that the agricultural implement houses are showing signs of entering the market more strongly, having become satisfied through the reports of their agents as to crops. There are no new developments of special interest in basic, malleable, northern foundry and other irons.

Coke.—The quotations on coke show a better feeling. Where \$1.90 would have been taken two weeks ago for prompt delivery, \$2.10 is now the figure, while for last half delivery \$2.25 to \$2.35 is the price for the best 72-hour selected Connellsville. The inquiries are increasing and during the week quotations were asked on 6000 tons of Connellsville and Wise county in about equal proportions. The inquiries on half year and full year contracts are of a very satisfactory character, but with no closings of importance as yet. A review of the month of June in practically all the offices shows that the aggregate business was larger than for any month since February. This has all, or nearly all, been done on requisitions on regular contracts, which shows that the consuming demand is setting in more and more strongly. The situation in pig iron is the same, the month's business bulking up well above the preceding three or four months.

Finished Iron and Steel.—There has been a good steady business in the finished products line all through the past week, with no exceptionally large inquiries or sales. In standard section steel rails the inquiries for the week aggregate probably 1600 tons, but none has been closed. Structural material is moving well, the contractors using up their supplies and calling for more to keep their stocks in shape. In this division of the market there have been no large new inquiries and no especially important sales. Plates have been quiet with very little doing and no change in prices. In the light rails the coal mines are making inquiries, but the lumber lines have shown no activity. Bars are in the same old situation and the differential in favor of iron still keeps them from cutting any material figure in the transactions. Track fastenings continue in fair request. Altogether the market seems to be in a good condition, with a feeling on the part of the principal houses that there will be a much more active business soon.

Old Material.—There is practically nothing new to report in the scrap market. Dealers are still taking lots for utilization later in the season, when, they feel sure, there will be greater activity. The prices are firm, and while the present situation continues speculative in a measure the foundation for the future is substantial. Much of the present tone of the scrap market is due to the generally better feeling in the new material lines. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails	\$12.50 to \$13.00
Old steel rails, rerolling	11.25 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.75
Relaying rails, standard section subject to inspection	23.00 to 23.50
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards cut apart	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates	\$11.00 to \$11.50
Iron car axles	18.50 to 19.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	9.75 to 10.25
Railway springs	9.00 to 9.50
Locomotive tires, smooth	14.50 to 15.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	5.00 to 5.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.00 to 8.50
Agricultural malleable	7.00 to 7.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	7.25 to 7.75
Railroad grate bars	8.00 to 8.50
Machine shop turnings	6.50 to 7.00

THE IRON AND METAL MARKETS

Buffalo

BUFFALO, N. Y., July 11, 1911.

Pig Iron.—Business for the week has been very good, with larger inquiry and a greater number of sales than for the week preceding. Placements noted aggregate about 40,000 tons of foundry irons of various grades and malleable from New York State, New England and Canada and for last half delivery. The orders include a number of large individual tonnages. Most of the furnace companies, being in better shape as to bookings for present quarter business, and as to bookings and prospects for output for last quarter, are much less inclined to make concessions in quotations and are well satisfied to hold off for better prices which many furnacemen anticipate will soon be in evidence, prices which have been ruling being considered altogether too low. One furnace interest has put prices up 25c. per ton over the entire schedule list. We quote as follows f.o.b. Buffalo for last half delivery:

No. 1 X foundry.....	\$13.75 to \$14.25
No. 2 X.....	13.50 to 14.00
No. 2 plain.....	13.25 to 13.75
No. 3 foundry.....	13.00 to 13.50
Gray forge.....	13.00 to 13.25
Malleable.....	13.75 to 14.25
Basic.....	14.00 to 14.75
Charcoal.....	16.50 to 17.25

Finished Iron and Steel.—The general situation continues to show a very favorable aspect and all indications point to a more than usually active midsummer trade. There has been further contracting for steel bars in the week with good demand in sheets and some business in plates and billets. Structural specifications are quite satisfactory and a good deal of fabricated work is coming up with architects. Prices have a strengthening tendency and are gradually getting better. Bids have gone in this week for the Eastman Kodak Company's office building, Rochester, N. Y., requiring about 1500 tons of steel, but the awarding of the contract has not yet been announced. John Gill & Son, Cleveland, have received the general contract for the Buffalo General Electric Company's 17-story building, requiring about 2000 tons. The George Kellogg Structural Company is the low bidder for steel for the Plymouth Methodist Church, Buffalo, about 100 tons. Figures are soon to be received for a business building for the Magnus Beck Brewing Company on Lafayette Square, Buffalo, taking 100 tons.

Old Material.—Good inquiry continues, but consumers are not willing to pay the prices asked by dealers. Consequently material is not going out on new orders in very large quantities. Some grades have been advanced. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel.....	\$12.50 to \$13.00
Low phosphorus steel.....	15.50 to 16.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 1 railroad and machinery cast scrap.....	13.50 to 14.00
Old steel axles.....	18.50 to 19.00
Old iron axles.....	22.00 to 22.50
Old car wheels.....	13.00 to 13.25
Railroad malleable.....	12.00 to 12.50
Boiler plate.....	11.00 to 11.50
Locomotive grate bars.....	11.00 to 11.50
Pipe.....	9.50 to 9.75
Wrought iron and soft steel turnings.....	7.00 to 7.25
Clean cast borings.....	6.50 to 7.00

Birmingham

BIRMINGHAM, ALA., July 10, 1911.

Pig Iron.—The sale of 2000 tons of gray forge iron is reported for shipment in September at \$9.25, Birmingham. A lot of 1000 tons of No. 3 foundry for shipment the last half was sold at \$9.50, Birmingham, and 750 tons of No. 2 soft for the same delivery brought \$10. The sale of 600 tons of No. 3 foundry for third quarter delivery at \$9.50 is also reported. Smaller lots than those mentioned placed during the week aggregate from 3500 to 5000 tons and are practically all for nearby shipment. The most important inquiries now pending consist of a lot of 2000 tons required by a stove manufacturer for shipment during the remainder of the year and 500 tons for early delivery by a pipe manufacturer. Considerably more demand for spot shipments has been noted than for some weeks, but the individual requirements are comparatively small. The movement from furnace yards so far this month has exceeded expectations and has represented practically the entire daily output at all furnace plants in operation. A scarcity of low grades has become very perceptible, in the case of one large producer, no grades below No.

2 foundry now being offered. The close adjustment of the furnace output to order-book requirements was emphasized by the stock returns of July 1, which showed only an increase of 1000 tons in the aggregate accumulation in the month of June. This increase is easily accounted for by the suspension of operations at foundries the last week in June, and at this time the actual consumption is believed to be greater than the production. Since the receipt of stock reports quotations on forward deliveries are no doubt firmer. A leading interest now adheres strictly to a basis of \$10.25, Birmingham, for last half shipment, and with other concerns the tendency to limit commitments at \$10 to shipments within the third quarter is decidedly more pronounced. As a result of the difference in views as to terms for delivery of tonnage sold at prevailing prices the business placed the past week went largely to two of the producing interests. It is noted that three of the smaller producers remain practically out of the market for any deliveries and that as yet no figures applicable to deliveries during the first quarter or first half of next year have been elicited from any producers. The accumulation of basic iron in this district was very materially reduced in the month of June, and returns from charcoal iron furnaces also showed a reduction. We quote the local market for prompt shipments as below, per gross ton, f.o.b. cars here, with an advance of from 25c. to 50c. per ton quotable for deliveries to cover the remainder of the year:

No. 1 foundry and soft.....	\$10.50
No. 2 foundry and soft.....	10.00
No. 3 foundry.....	9.50
No. 4 foundry.....	9.25
Gray forge.....	9.25
Mottled.....	9.00
Standard basic, chill cast.....	10.25
Off basic.....	9.75
Charcoal car wheel iron.....	22.50

Cast Iron Pipe.—It is understood that the contract for Los Angeles, Cal., recently placed, went to a Virginia company. Local concerns are bidding on a lot of 750 tons for San Diego, Cal., which will probably be placed within two weeks. The city of Dothan, Ala., is soon to enter the market for sufficient tonnage to construct a modern water works system, and several other Southern cities will place orders as soon as financial arrangements can be made. Both of the local plants are now in full operation with sufficient on order-books to warrant steady going for some months. No change has been made in quotations for any sizes or grades, and we continue to quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6-in., \$22; 8 to 12-in., \$21; over 12-in., average \$20, with \$1 per ton extra for gas pipe. These prices are probably subject to shading for large municipal contracts.

Old Material.—Dealers do not report any change in the condition of this market in the past week, although, with the scarcity of low-grade pig iron more pronounced, a much stronger demand for light cast is anticipated. Forwardings of steel grades during the week were very light and the receipts at dealers' yards of little consequence. The tonnage of railroad wrought offered in this market for some months has been exceptionally light, but with the dismantling of the old Gate City rolling mill a good tonnage of machinery cast will be offered. We continue to quote, nominally, as follows, per gross ton, f.o.b. cars here:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Coal and Coke.—Standard Alabama 72-hour foundry coke is now quoted at an advance of 25c. per ton over last quotations for contracts covering a twelve-month period. The price for furnace and domestic coke is unchanged, but those grades are more in demand. No change has been made in the current quotations for steam coal. The 1911-1912 contracts for this last named have practically all been placed and the mines generally have been allotted a good tonnage, but the surplus production which has resulted from the opening of new shafts and the increase in the force employed at other mines is not yet fully taken care of. The movement of domestic coal is fairly under way with prices very close to those obtained last season.

THE IRON AND METAL MARKETS

New York

NEW YORK, July 12, 1911.

Pig Iron.—A fair business is reported in moderate lots. No large transactions have occurred in this immediate territory as far as could be ascertained. Inquiries are few, but among them is one for 5000 tons. While a limited number of eastern Pennsylvania makers are somewhat aggressively seeking business, the Buffalo producers, on the other hand, appear to entertain more confidence as to the immediate future and are holding prices firmly at a slight advance. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2X, \$15 to \$15.25; No. 2 plain, \$14.50 to \$15. Southern No. 1 foundry is quoted at \$14.75 to \$15.25 and No. 2, \$14.25 to \$14.75.

Cast Iron Pipe.—The city of New York will open bids on 1200 tons of water pipe for Long Island City July 14. The demand for small lots is less active. Car-load lots of 6-in. are quoted at \$21 to \$22 per net ton, tidewater.

Finished Iron and Steel.—A conspicuous feature of the week was the small amount of new large work in structural lines offered to fabricators and steel producers. A fair aggregate of large work, however, was awarded as the enumeration below shows. Bar iron is dull, but no price changes are reported. No additional evidence was obtained of specially large orders in New York territory for steel bars. Plate mills are said to be running about 70 per cent. capacity, but orders are for immediate shipments. Jones & Laughlin Steel Company will fabricate the 3300 tons of the Adams Express Building, New York, and the 900 tons of an insurance building in Richmond, Va.; the Pennsylvania Steel Company will supply 1000 tons for Boston & Albany bridges at Worcester, Mass., 1000 tons for a Delaware & Hudson bridge and the 550 tons for the Glen Onoko bridge of the Central Railroad of New Jersey; the Fort Pitt Bridge Company has been given 400 tons of New York Central work in New York and 1000 tons for the Delaware, Lackawanna & Western piersheds in New York; the Hay Foundry & Iron Works has 800 tons for a Newark bank; the A. E. Norton Company has 700 tons for a loft on West Thirty-seventh street, New York; Radley Steel Construction Company has 1000 tons for a loft building at Thirty-sixth street and Madison avenue; the Lackawanna Bridge Company has 800 tons for the American Radiator Company's warehouse at Bayonne; American Bridge Company has 500 tons for the Wilkins building, Washington, and the Cambria Steel Company has 300 tons for a powerhouse extension, General Electric Company, at Schenectady, N. Y. Bids are now in for the 2500 tons of piersheds at Norfolk, Va.; taking of bids for the 12,000 or 14,000 tons for the Kansas City terminal has been postponed to July 20 and bids are being taken for a 1500-ton brew-house structure for Jacob Ruppert, New York. An estimate of 4000 tons has been made for the requirements of the revised Æolian building. It is expected an award will before long be made for the plates for two government colliers, involving approximately 8000 tons. Provisional awards for parts of the Lexington avenue subway have been made, but the additional official approval required and the present consideration of operating arrangements do not necessarily make them final. Sections 6, 8, 10 and 11 have been given to the Bradley Contracting Company, including 16,800 tons of riveted steel and steel beams and 2600 tons of steel bars, and section 7 has been given to Chas. H. Peckworth, including 8000 tons of riveted steel and steel beams and 400 tons of steel bars.

Old Material.—Conditions continue exceedingly unsatisfactory in this branch of trade. Dealers find it very difficult to do business at the existing level of prices. On the one hand, consumers are persistently endeavoring to purchase cheaper, while on the other hand those who have stocks are unwilling to let them go at a price to enable transactions to be put through. Sales are limited to small quantities, steel scrap being probably the leader in the tonnage moved. The foundries are purchasing cast scrap quite sparingly at present, as they are having difficulty in keeping their molders at work, owing to the hot weather. The Isthmian Canal Commission is inviting bids, to be opened September 5, for the purchase of material in the Canal Zone, Isthmus of Panama, consisting of abandoned locomotives, dump cars, dredges, parts of old machinery and miscellaneous junk, and all other French material that has not been taken up by the Canal Commission and credited to "French scrap." The material will be sold as it lies, the purchaser to bear all expense of breaking up, han-

dling, removing and transporting it within three years. Quotations are as follows per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.75 to \$11.00
Heavy melting steel scrap.....	10.75 to 11.00
Relaying rails.....	20.00 to 21.00
Rerolling rails..... (nominal)	12.00 to 12.25
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turning.....	6.25 to 6.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

Metal Market

NEW YORK, July 12, 1911.

The Week's Prices

		Cents Per Pound for Early Delivery.				Spelter.	
		Copper, New York.		Lead.		New St.	
	Lake.	Electro-lytic.	Tin. New York.	New York.	St. Louis.	York.	Louis.
July.		12.62½	44.75	4.50	4.35	5.80	5.60
6.....	12.87½	12.62½	44.00	4.50	4.35	5.80	5.60
7.....	12.87½	12.62½		4.50	4.35	5.80	5.60
8.....	12.87½	12.62½		4.50	4.35	5.80	5.60
10.....	12.80	12.60	43.75	4.50	4.35	5.80	5.60
11.....	12.75	12.55	43.75	4.50	4.35	5.80	5.60
12.....	12.75	12.55	43.50	4.50	4.35	5.80	5.60

Tin is listless and lower. Copper is in poor demand and somewhat weaker. Lead is dull but firm. Spelter continues fairly active.

Copper.—The copper market has been quiet all the week and prices have fallen off somewhat. Many consider the weakening of the market due to the lack of demand, as price reductions were certainly not very marked and some holders of copper have refused to make any concessions under the price demanded a week ago. Electrolytic copper could be bought in the New York market to-day for 12.55c., while lake could be had at 12.75c. The London market was easy this morning with spot copper offered at £57 2s. 6d. The exports of copper so far this month have been fairly good, amounting in all to 9795 tons.

Copper Averages.—The Waterbury average for June was 12.62½c. The average price of lake copper for June was 12.71c. and the average price of electrolytic was 12.47c.

Pig Tin.—The expected arrival of the steamer Minnetonka to-morrow with 1000 tons of tin on board has reduced the premiums on spot tin and to-morrow will see the end of a shortage in the immediate supply of tin in this country for the time being. During the week the tin on board the Minnetonka has been traded in at from 1c. to 1¼c. less a pound than was the price demanded in the New York market. This tin has been bought and sold and resold to such an extent that it now belongs to consumers and will be shipped to them direct from the boat. This relieves the situation, as consumers will be largely supplied for their early wants and not much buying is expected. The tin that is left will be put on the market and lower prices will probably result. Outside of trading in the Minnetonka tin there has been little doing in the New York market as the demand has been light and the weather conditions have contributed to the general listlessness in trading. Spot tin is offered in this market this morning at 43.50c. and tin on board the Minnetonka can be had at about 1c. less. The London market has been inactive and somewhat weaker. This morning spot tin was sold in London at £195 10s. and futures at £188 15s. Arrivals of pig tin in this country so far this month have been 971 tons, while there are 2500 tons afloat, which includes those on board the boat due to arrive to-morrow.

Tin Plates.—The market in tin plates is quiet and the price is unchanged at \$3.94 for 100-lb. coke plates. Foreign tin plates were offered this morning at the same price as a week ago, which is 13s. 9d. at Swansea, Wales.

Lead.—While lead is firm there has been very little buying. Consumers show no interest, but the outside sellers who are usually the first to cut the market are looking for an increased demand and are maintaining their price very firmly at 4.50c. New York, and 4.35c. St. Louis.

Spelter.—A fairly active demand exists for spelter, brass manufacturers being the principal buyers. Prices

THE IRON AND METAL MARKETS

have been fairly steady all the week, but the market is somewhat disorganized, and sellers are, in some cases, obliged to make concessions to induce trade. The metal was offered in New York to-day at 5.80c., and in St. Louis at around 5.60c. It is possible that these prices might be shaded.

Antimony.—Antimony has been quiet, and nothing more has been heard from the syndicate with the exception that some of those interested have been cutting prices, which is taken as an indication that they have quit the combination. Hallett's is weak at 8.12½c., and it can be bought for August and September delivery at 7.75c. Cookson's is 8.50c., and Chinese and Hungarian grades are 7.30c.

Old Metals.—The market is steady, with dealers' selling prices, New York, unchanged, as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	8.00 to 8.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc, scrap.....	4.25 to 4.30

Chicago

JULY 11.—The market for metals is dull and sluggish, with prices soft. Copper is off slightly and concessions were recorded in pig tin. We quote Chicago prices as follows: Casting copper, 12.65c.; lake, 13.00c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 45c.; small lots, 42c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.65c. to 5.70c.; Cookson's antimony, 9¼c., and other grades, 8¼c. to 8¾c., in small lots; sheet zinc is \$7.50 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 10¾c.; copper bottoms, 9½c.; copper clips, 10¼c.; red brass, 9¼c.; yellow brass, 7½c.; lead pipe, 3.90c.; zinc, 3.90c.; pewter, No. 1, 26c.; tin foil, 33c.; block tin pipe, 37c.

St. Louis

JULY 10.—The condition of the metal market is very satisfactory, quotations generally being firm and the metals in good demand. Pig tin is quotable at 44.85c., with an excellent demand. Lake copper is firm at 13.10c. and electrolytic at 13c., the same as last week, but well held at the figures. Antimony, Cookson's, is 8.85c. and strong. Lead is in good request and well held at 4.37½c., while spelter is also strong at 5.55c. to 5.60c. The ore market at Joplin holds up well on a basis of \$42.31¼ per ton for 60 per cent., choice lots going as high as \$45. Calamine is in good demand at \$21 to \$24 on a basis of 40 per cent. zinc at the bins and choice lots as high as \$30. Lead ore is passing as high as \$57 to \$60 per ton at the bins. Old metals are quoted as follows: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3¼c.; pewter, 20c.; tin foil, 29c.; tea lead, 3c.

Lake Ore Shipments for May

The movement of Lake Superior ore from upper Lake docks in June was 7,316,592 gross tons, an increase of 1,235,234 tons over May, but a decrease of 2,490,087 tons from June, 1910, or 34.03 per cent. The total shipments to July 1 this year were 14,918,258 tons, a decrease of 6,075,350, or 40.72 per cent. from 1911. In the following table the shipments are given by ports for the two years in gross tons:

Port and Dock.	June, 1911.	June, 1910.	To July 1, 1911.	To July 1, 1910.
Escanaba	538,168	767,618	1,067,708	1,739,735
Marquette	314,807	533,358	533,738	1,150,244
Ashland	394,555	708,248	662,412	1,515,555
Superior	1,635,651	1,321,877	2,951,490	2,632,835
Duluth	1,102,979	2,567,077	2,050,134	5,097,262
Two Harbors.....	840,345	1,418,414	1,577,426	2,782,627
Total	4,826,505	7,316,592	8,842,908	14,918,258
Decrease	2,490,087		6,075,350	

The Vigo Iron Company and the Wabash Iron Company, both of Terre Haute, Ind., have filed notices of dissolution. The former company operated a blast furnace for a number of years, but ceased its activity about 1897. The latter ran a rolling mill which was sold to the Republic Iron & Steel Company and was dismantled about 1905.

Iron and Industrial Stocks

NEW YORK, July 12, 1911.

The stock market of the past few days has chiefly been influenced by the weather reports, stocks generally advancing or declining according to the news from the agricultural sections. One stock whose course was determined by unknown influences was Virginia Iron, Coal & Coke, which made the phenomenal rise of \$24 per share from Wednesday to Friday. American Steel Foundries and American Shipbuilding common declined because of the passing of dividends. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalmers, com.....	8½	Pressed St., com...	36 - 36½
Allis-Chalmers, pref., 28 - 29		Railway Sps., com.	35½ - 36½
Beth. Steel, com... 32¼ - 33		Railway Sps., pref.....	101½
Beth. Steel, pref.... 62 - 63½		Republic, com.....	29¾ - 30¾
Can. com..... 10½ - 11½		Republic, pref.....	93½ - 93¾
Can., pref..... 84¼ - 86½		Sloss, com.....	48½ - 49
Car & Fdry., com... 55 - 56½		Pipe, com.....	16 - 16½
Car & Fdry., pref..... 117		Pipe, pref.....	35½
Steel Foundries..... 36 - 40½		U. S. Steel, com.....	77½ - 79½
Colorado Fuel..... 34¼ - 34¾		U. S. Steel, pref.....	118 - 119
General Electric..... 159 - 163½		Westinghouse Elec.	74½ - 76½
Gr. N. ore cert..... 59½ - 61¼		Va. I. C. & Co.....	71 - 97
Int. Harv., com.... 122 - 123½		Am. Ship, com.....	57½ - 63¾
Int. Harv., pref.... 124 - 124½		Chi. Pneu. Tool....	51½ - 51¾
Int. Pump, com.... 40½ - 41¾		Cambria Steel.....	44½ - 45
Int. Pump, pref.... 89¼ - 89¾		Lake Sup. Corp....	25 - 26½
Locomotive, com..... 41		Pa. Steel, pref.....	106½
Nat. En. & St., com. 18 - 19¾		Crucible St., com...	12¼ - 13
Nat. En. & St., pref. 95 - 96		Crucible St., pref...	81¾ - 81½
Pittsburgh St., pref. 103¼ - 105		Harb. Walk Ref., pref...	98

Dividends Declared.

The Collins Company, Collinsville, Conn., regular semi-annual, 4 per cent., and extra 1 per cent.

The Turner Tanning Machinery Company, semi-annual, 3½ per cent., payable July 25.

The International Steam Pump Company, quarterly, 1½ per cent. on the common and 1¾ per cent. on the preferred.

The American Wringer Company, quarterly, 1½ per cent., payable July 15.

The American Steel Foundries has announced the suspension of dividends on its capital stock, the reason being the long-continued economies of the railroads.

The Vulcan Detinning Company, regular quarterly, 1¼ per cent., payable July 20.

The Harbison-Walker Refractories Company, regular quarterly, 1½ per cent., payable July 20.

Iron and Steel Expert Wanted.—The United States Appraiser of Merchandise at the Port of New York is looking for an iron and steel expert. About two million dollars' worth of steel is imported at New York each year. The examiners under the appraiser examine, classify and value this for the assessment of duty. The maximum legal salary for the position is \$3,500 per annum. Examiners are customarily paid from \$1,800 to \$2,500 per annum on their entry into the service.

The Superior Court, Indianapolis, has approved the sale of the Jenney Electric Company's plant at Anderson, Ind., to the American Rotary Valve Company, Chicago, for \$135,000. This company was the sole bidder at the sale of the plant at the office of the receiver, the Security Trust Company, Indianapolis. The plant is in operation, and the new owners took possession July 1. The property includes 10 acres of ground as well as the factory buildings. The company may consolidate two plants now operated in California and Illinois. In addition to motors (manufactured by the Jenney Company) it is announced that street car air compressors, vacuum cleaners and rotary valves will be made at the Anderson plant.

The American Steam Gauge & Valve Mfg. Company announces that Gardner Cornett, its vice-president, is now permanently located at the company's office, 30 Church street, New York. This office is under the management of Charles A. Allen, who has been connected with the company for many years.

The Warwick Iron & Steel Company, Pottstown, Pa., is preparing to blow in its No. 2 furnace.

The Pulaski Iron Company's blast furnace at Pulaski, Va., was blown in July 3 after an idleness of a month for repairs.

Trade Publications

Rolling Mill Machinery.—The Youngstown Foundry & Machine Company, Youngstown, Ohio. Catalogue. Size, 7 x 9½ in. This is the company's 1911 catalogue, illustrating and describing a line of rolling mill machinery which includes rolls, roll lathes, shears and ingot cars. The roll lathes are built in various sizes from 18 to 42 in. for either belt or direct connected motor drive and the shears include belt and motor driven lever types and a billet shear.

Steam and Power Pumping Machinery.—American Steam Pump Company, Battle Creek, Mich. Catalogue No. 18. Size, 6 x 9 in.; pages, 188. Illustrations and descriptive matter explain the operation of an extensive line of steam and power pumping machinery which includes the Marsh steam pumps and air compressors and American simple, compound and power pumps and air compressors. The catalogue is divided into sections each of which deals with some particular group of apparatus, as boiler feed pumps, tank and vacuum pumps, air compressors, deep well pumping engines, automatic feed pumps, sugar house and creamery pumps, sinking pumps, etc. In each of these sections the various styles of machinery made are grouped with illustrations, brief descriptions and capacity tables. A number of tables of useful information giving capacity of pumps in gallons, dimensions and weight of wrought iron pipe, friction loss in pipe in pounds pressure and the duty of pumping engines complete the catalogue.

Punching, Shearing and Bending Machinery.—New Doty Mfg. Company, Janesville, Wis. Catalogue G. Describes and illustrates a line of punching and shearing machinery and bending and straightening rolls for use in all shops where heavy machinery is used for working up iron and steel. A general description of the machines is first given followed by half tone engravings of the special types and complete dimension tables.

Light and Power Transformers.—Triumph Electric Company, Cincinnati, Ohio. Circular. Devoted to the Triumph type L transformers which are designed for use on pole lines carrying single-phase current. The special features of this transformer are a low copper loss, good regulation and a low reactive drop. These features together with others of its construction are pointed out and a table giving the efficiency of the different sizes together with the core and copper losses and the approximate weights is included. These transformers are made in sizes ranging from 0.6 to 50 k.v.a., and can be supplied for any frequency from 50 to 140 cycles, although the normal figure is 60. The normal voltages are 1100-2200 on the primary and 110-220 on the secondary with a variation of 10 per cent. above and below. *The Iron Age*, February 2, 1911, contained an illustrated description of this transformer.

Chucks.—The Cushman Chuck Company, 39 Ann street, Hartford, Conn. Catalogue. Size, 5½ x 7¼ in.; pages, 32. Illustrates and describes an extensive line of chucks and face plate jaws. The various types of chucks listed include independent two and four jaw chucks, universal geared scroll chucks, special chucks with three and four jaws for the back end of cutting-off machines, universal two-jaw chucks, a centering chuck and two styles of drill chucks. In addition to the chucks space was given to illustrations and descriptive matter concerning the Cushman reversible face plate jaws which are intended to be used on large lathes and boring mills as a substitute for chucks. Under the illustrations of the various chucks brief specifications and a list of prices are given. Several styles of drill chuck arbors are illustrated and a list of repair parts and prices completes the catalogue.

Draft Gear.—The T. H. Symington Company, Baltimore, Md. Pamphlet entitled "Two Yokes in Transportation." Gives general description and specifications of the Farlow draft rigging, the special feature of which is that there is no yoke. The description is divided into three parts dealing with the mechanical, the transportation and the economic features. The illustrations on the two center pages show the contrast between the replacing of a coupler having a yoke and the M. C. B. slotted butt coupler with the Farlow key connection. Instructions for assembling a draft gear are included and an illustrated list of the Farlow parts for one car completes the pamphlet.

Portable Crane and Hoist.—The Franklin Portable Crane & Hoist Company, Franklin, Pa. Pamphlet. Size, 4 x 7¼ in.; pages, 32. Contains illustrations and brief specifications on facing pages of 12 sizes of a portable crane and hoist for use in shops, factories or wherever it is necessary to lift or to transfer heavy bodies. The construction of the hoist and its operation are briefly described with illustrations. It is designed as an accessory to and in some cases as a substitute for the overhead crane and the industrial railway since two men can easily lift and carry three-ton loads to all corners of the shop.

Pneumatic Hammer.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 2010. Refers to the Crown pneumatic hammer which is made for both chipping and riveting. The construction of the hammer is described, the text being supplemented by illustrations of the various parts and a complete list of repair parts is included.

Air Brakes.—Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 1524, superseding No. 1509. Lists the various repair parts for the auxiliary air brake apparatus made by this company and contains numerous illustrations with prices.

Rope Drive.—Lambeth Rope Corporation, New Bedford, Mass. Pamphlet entitled "The Natural Transmission." After a brief historical account of the origin and development of the driving, the manufacture of the Lambeth transmission rope is described, followed by discussions of the relative merits of cotton and manila rope and the causes of rapid wear and power loss in transmission rope. A table of the power transmitted under favorable conditions by rope of various sizes and at different velocities is given, as well as a set of detailed instructions for splicing rope.

Automatic Screw Machine Work.—The National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. The piece is 1 in. long and ⅝ in. in diameter at the large end, which is knurled, and there is a ¼-in. threaded hole extending about half way through, while the other end is externally threaded and reamed with a ¼-in. hole to meet it. In producing this piece the tapping, threading and the knurling were done in one operation and six other operations were performed in the time required to form the piece. Nine tools in all were used to form the piece and this was done by operating on the piece in four positions. In the first, the piece was formed with the side tool and a ¼-in. hole drilled with an end tool. In the second position the top was faced and the small tapped hole drilled. In third position the piece was tapped and the thread cut from the end position with a combination tap and die and the head knurled from the top slide. In the last position the piece was tapered, the large hole reamed from the end and the piece finally cut off with a side tool.

High-Speed Planer and Matcher.—S. A. Woods Machine Company, Boston, Mass. Circular. Illustrates the No. 400 series of Wood's planers which are built for handling hard and soft wood at feeds running as high as over 200 lineal feet per minute. The equipment of these machines includes a profile attachment for working on various types of molded stock at from 100 to 200 lineal feet per minute which was illustrated in *The Iron Age*, October 6, 1910.

Transformers.—Crocker-Wheeler Company, Ampere, N. J. Folder. Treats of the Remek transformer in which it is claimed the eddy currents set up in the lap-joints of the core laminations are eliminated as well as the vibration of the laminations at the joints. Other special features are an exceptionally high permeability and the securing of uniform and low temperature by exposing the larger portion of the transformer coil to freely circulating oil.

Boilers.—The Babcock & Wilcox Company, New York City. Catalogue. Relates to the Rust water tube boiler. After a brief history of the boiler its general construction is taken up followed by the results secured in service and reports of a number of efficiency and capacity tests. The illustrations which include the special features of the boiler and numerous installations are almost all the full size of the page 5 x 7¼ in.

Metallic Packing.—C. Lee Cook Mfg. Company, Louisville, Ky. Pamphlet. Relates to a line of metallic packing which is made in single and double types for piston rods and Corliss valve stems. In addition two types of split metallic piston rod packing designed for inside and outside use are made which is the company's standard type of split packing for all classes of service. The various kinds of packing are illustrated on the pages facing the text description and in the engravings the various parts are lettered to correspond with the text so as to identify them and serve as a guide to the proper application.

Hot Saw and Burring Machinery.—Ajax Mfg. Company, Cleveland, Ohio. Folder. Deals with the Ajax hot saw and burring machine which is made in three sizes having a saw and burring head 15, 20 and 30 in. in diameter. This machine is designed for operation at a peripheral speed of 6500 ft. per minute and will saw a 1-in. bar in 1 sec. or will mill 1 in. of stock from a 1-in. bar in 10 sec. *The Iron Age*, February 2, 1911, contained an illustrated description of this machine.

Calorimeter and Burner.—Precision Instrument Company, 49 West Larned street, Detroit, Mich. Two bulletins. In the first, G, illustrations and descriptive matter explain the operation of Roland Wild's calorimeter for estimating the heating value of solid fuels. This instrument is of the sodium peroxide type in which a mixture of the fuel and sodium peroxide is fired in a combustion chamber immersed in water and is offered as a simple machine and accurate instrument. The second bulletin, H, deals with Carpenter's Metropolitan argand burner No. 2, which is said to be the only burner which approaches perfect combustion with any kind of gas whether coal gas, enriched coal gas or coal gas mixed with carbureted water gas. One of the special features of this burner is that the air supply can be adjusted for the different kinds of gas being burned.

Foundry Coke.—Graceton Coke Company, Graceton, Indiana County, Pa. Booklet showing by analysis and test the structure and toughness of the Graceton foundry coke, its freedom from ash and impurities. Numerous cupola tests are reported and a large amount of information of use to the foundryman is inserted.

Coal Washing.—Foust Concentrator Company, 332 South Michigan Avenue, Chicago, Ill. Pamphlet. Is a general discussion of the process of coal washing to remove the impurities occurring in coal deposits, and shows how the use of the Foust jig increases the efficiency of the process. The construction and the operation of the jig are described at length, and two line engravings on facing pages give the details of its construction.

Ball Bearings.—J. C. Bretz Company, 1004 Times Building, New York City. Catalogue. Size, 6¼ x 9¼ in.; pages, 133. De-

scribes the various styles of F. & S. ball bearings which this company handles as the sole American agent. Two general styles of bearings are made, namely, the single and double row bearings. These can be supplied in a number of different types for journals and also for single and double thrust bearings. The various types of bearings are illustrated and a table giving the principal dimensions and specifications for them is given underneath the illustrations.

Engineering Specialties.—Wm. Powell Company, 2521 Spring Grove Avenue, Cincinnati, Ohio. Catalogue No. 10. Size, $5\frac{1}{2} \times 8$ in.; pages, 320. This is the company's 1911 catalogue illustrating and describing a complete line of engineering specialties and supersedes all previous editions. Among the various articles listed are the company's White Star globe, angle and check valves in a number of different sizes; union composite disk valves, throttle valves, White Star and sliding stem gate valves, injectors, needle point and safety valves, lubricators, grease cups, water gauges, etc. Under all of these different specialties a list of the various sizes in which they are made together with the prices is given. The main portion of the catalogue occupies 287 pages, and the remaining pages are given over to tables of useful information. These deal with steam boilers, boiler horsepower, capacity of chimneys, weights of various metals, areas and circumferences of circles, carrying capacity of copper wire and data on belting.

Concrete Mixer.—The Standard Scale & Supply Company, 243 Water street, Pittsburgh, Pa. Three bulletins. The first, Y-39, contains a number of testimonial letters from contractors and users of the Eclipse concrete mixer which was illustrated in *The Iron Age*, November 24, 1910. The construction of the mixer and the various sizes in which it is made are illustrated and described in bulletin Y-40, while Y-43 shows how money may be saved by the purchase of one of these machines.

Mechanical Stoker.—The American Stoker Company, 11 Broadway, New York City. Bulletin A-1, entitled "Furnace Stoker Proofs." Contains a list of repeat orders which have been received by the company from its patrons during a period extending in some cases as far back as 1898.

Steel Shapes and Springs.—Harrow Spring Company, Kalamazoo, Mich. Monthly stock list. Gives the various quantities of flat, round, square and oval bars, channels, angles, special shapes and sections, and spring, alloy, machinery, reinforcing and automobile steels which this company regularly carries in its warehouse. All of the special shapes and sections and the different types of steel springs are illustrated and briefly described.

Wells Drilling Cable.—American Mfg. Company, 65 Wall street, New York City. Pamphlet. Size, $5\frac{1}{4} \times 7$ in.; pages 31. Deals with the American drilling cable which is made from a special grade of Manila hemp. The preparation and manufacture of the rope are described and the special features of non-stranding, elasticity and waterproofness are discussed. Space is also given to other products of this company including sand, sucker rods, tubing and torpedo lines.

Pumps.—Henry R. Worthington, 115 Broadway, New York City. Two bulletins. The first, No. W-17625 A, pertains to the Worthington type D centrifugal pumps for low-head service. These pumps were designed to meet the demand for a reliable pump at a low price and are especially suitable for contracting work such as pumping out coffer-dams and excavations and also for small irrigation plants where a low first cost is more important than economical operation. The drive for these pumps is from a line shaft, engine or motor through a belt connection, although if desired gas engine direct connected units can be used on very low heads and where the space is limited, as, for example, in the case of circulating pumps on shipboard a steam engine can be directly connected to the pump. A number of combinations of the pump are shown including a portable direct connected gasoline engine set. Tables of capacity, speed, horsepower and dimensions are given as well as instructions for installing and operating the pumps. The second bulletin No. W-18525 describes and illustrates single and two stage house pumps which are designed for direct connection to an electric motor. Directions for installing and operating the house pump together with a diagram showing a two-stage unit installed with an elevated tank and a float for automatic operation are included. Space is also given to the Worthington standard sump pump which is of the submerged type. On account of its position in the pit the pump is continually primed and can be started by a float which closes the motor circuit as the level of the water in the sump rises.

Platinum and Platinum Apparatus.—J. Bishop & Co., Platinum Works, Malvern, Pa. Catalogue. Size, $5 \times 8\frac{1}{4}$ in.; pages, 47. This is the company's 1911 catalogue illustrating a line of platinum laboratory apparatus including the Aupperle combustion apparatus, plain and Gooch crucibles, dishes, incinerating pans, retorts, bottles, filter cones, crucible tongs, tweezers, anodes, cathodes, electrodes, triangles, deflagration spoons, wire, foil sheets and gauze. All of these are illustrated and briefly described, and in addition instructions on the care and use of platinum wire, tables of weights of wire and foil and areas and circumferences of circles are included.

Metals.—Empire Metal Company, Syracuse, N. Y. Five pamphlets. Deal with the various types of metals produced by this company which include solder of various compositions and shapes, silver metal that is used as a galvanizing flux alloy, phosphor, tin and copper, iron magnite which consists of silicon combined with sodium and ammonia salts and forms an economical substitute for phosphorus as a deoxidizer, several kinds of aluminum metals and

a number of different types of bearing metals for various conditions of service. In all of the booklets the general forms in which the different metals are marketed are illustrated and a brief description given of their properties and uses.

Pyrometers.—Wilson-Maculen Company, 1 East Forty-second street, New York City. Pamphlet and chart. The former describes and illustrates the various types of electric pyrometers which this company manufactures for stationary and portable use together with fire rods, thermocouples and pyrometer tubes. The pyrometers listed include those of the standard type as well as a long scale instrument, an indicator for high temperature pyrometers and a portable Le Chatelier pyrometer which is an exceptionally accurate instrument. The chart gives the melting points of the elements according to the records of the United States Bureau of Standards and on the reverse side is given a table of factors for the exact conversion of Centigrade degrees to Fahrenheit and vice versa together with a table of interpolation values.

Machinist Tools and Supplies.—Peter A. Frasse Company, 417 Canal street, New York City. Wall hanger containing a map of New York showing the principal points of interest, steamship piers, railroad stations, etc., and the new office building recently completed by the company.

Induction Motors and Air Compressors.—Allis-Chalmers Company, Milwaukee, Wis. Two bulletins. The first, No. 1081, superseding No. 1040, describes and illustrates a line of polyphase induction motors and their applications. Tables of ratings and illustrations of installations are included. The second, No. 1523, superseding No. 1513, describes portable and stationary air compressors for industrial purposes operated by either direct current or induction motors. The various parts of the compressors are illustrated and described and a number of data tables complete the bulletin.

Conveying Machinery.—Chain Belt Company, Milwaukee, Wis. Catalogue No. 40. Size, 6×9 in.; pages, 278. Shows a complete line of elevating and conveying machinery for coal, ashes and wood pulp; box elevators, freight hoists and conveyors and water elevators together with the various types of chain, sprockets, buckets and gears used. A complete list giving the dimensions and prices of the various sizes of parts made and an extensive alphabetical index are special features.

Drop Forged Steel Lathe Dogs and Clamps.—The Armstrong Bros. Tool Company, 339-357 North Francisco avenue, Chicago, Ill. Catalogue, $3\frac{1}{2} \times 6\frac{1}{2}$ in.; pages 8. Deals with a line of lathe dogs of various types, all of drop forged steel. They include bent tail and straight tail dogs with single screw, in sizes $\frac{1}{4}$ to 6 in.; heavy duty dogs with straight tail and double screw, 2 to 8 in.; clamp lathe dogs with capacities between screws from $\frac{1}{4}$ to $\frac{3}{4}$ in.; U clamp dogs in capacities from $\frac{1}{4}$ to $\frac{3}{4}$ in. up to $1\frac{1}{2}$ to 5 in.; U clamp drill holder in sizes $\frac{1}{4}$ to 1 in. up to $\frac{3}{4}$ to 3 in.; a bolt driver in 2, 3 and 4 in. sizes; machinists' clamps; and an improved type of C clamps in sizes from $\frac{1}{4}$ to $1\frac{1}{2}$ in. The pamphlet contains illustrations and tables of sizes.

The Remek Transformers.—The Crocker-Wheeler Company, Ampere, N. J. Catalogue, $3\frac{1}{2} \times 6\frac{1}{2}$ in.; pages 18. Devoted to the Remek transformer and copiously illustrated, showing the construction and the reason for efficiency and durability. Tables give the results of a series of tests.

Industrial Railway Equipment.—Ernst Wiener Company, 38 and 40 Dey street, New York. Pictorial circular. Gives illustrations of practically everything entering into the equipment of industrial railroads, from track and switches to cars and locomotives.

Cut-off Coupling Friction Clutch.—Carlyle-Johnson Machine Company, Manchester, Conn. Bulletin 100. Describes a type of the company's clutch which is modified to meet cut-off coupling requirements in connecting the ends of two shafts. Its chief use is in connecting the motor to the propeller shaft of motor boats, the device being small and compact and at the same time capable of handling considerable power at high speed. It is made in five sizes, ranging from 2 to 6 h.p. The maximum diameter ranges from $\frac{4}{16}$ in. to $\frac{6}{16}$ in., the length of the clutch body from $\frac{4}{16}$ in. to $\frac{6}{16}$ in., and the standard lengths of hub from 4 in. to $\frac{8}{16}$ in.

Tobin Bronze.—Ansonia Bronze & Copper Company, 99 John street, New York, and Ansonia, Conn. Pamphlet devoted to Tobin bronze, of which the company is the sole manufacturer. Illustrated; 36 pages. Contains much valuable information regarding the metal, including scientifically procured data as to its physical characteristics and tables of tests. Its use for special purposes is brought out in considerable detail.

Heraeus Le Chatelier Pyrometer.—Charles Engelhard, Hudson Terminal Building, 30 Church street, New York City. Two pamphlets. One is the nineteenth edition of the catalogue of this device, containing 86 pages, in which the apparatus is described in much detail with illustrations. The second is known as "Hand Book No. 1" and is a guide for the correct installation of the pyrometer in annealing ovens, heating and tempering furnaces, potteries, brass works, blast furnaces, factories, boiler plants and chemical works.

Steel Furniture and Trucks.—Angle Steel Stool Company, Otisco, Mich. Pamphlet. Describes the company's line of steel stools, chairs, work tables, tool trucks, etc. The description of one of this company's trucks appeared on page 1574 in *The Iron Age* of June 29. The construction of this line is shown in detail in the circular and the price lists of the various sizes are given.

Standards of Safety in Relation to Machinery*—I.

The System of the United States Steel Corporation in Ridding Works of Their Dangers—The Problems That Have Been Solved

BY DAVID S. BEYER.

No one knows definitely, or even approximately, how many men are injured in industrial accidents in the United States. The laws and regulations which cover the recording of such accidents vary widely in different parts of the country and the resulting statistics are scattering and incomplete. The Government Department of Commerce and Labor, after an investigation of this matter in 1908, estimated that there are from 30,000 to 35,000 fatal and not less than 2,000,000 non-fatal accidents every year.

A writer in one of our current magazines makes a somewhat different estimate; he substantiates his figures by a comparison with foreign countries where there is a better record of such statistics, and asserts that there are 100,000 violent deaths in our industries every year, and that the total number of men killed or seriously injured is approximately 500,000. He further states that the loss in the entire Russo-Japanese war, including casualties on both sides, was about 335,000. If it is true that each year of industrial activity in the United States rolls up a larger total of killed and injured men than all the battle fields of the great Asiatic war, it seems not inappropriate that this writer in treating of the accident situation heads his article "The Carnage of Peace."



Fig. 1.—The Convenient Hanging Push Button, Which Stops the Motor Driving a Mill Unit. With Each Unit Is a Lamp Which Is Kept Burning.

In 1906-'07 Miss Eastman made a detailed study of 12 months' fatalities in the Pittsburgh industrial community, during which period she found that 526 men were killed and as many more suffered permanent injury. About half of these men were married, and a considerable percentage of the remainder had relatives who were dependent upon them.

It is unnecessary for me to point out the vital relation of the accident hazard to the other social problems of an industrial community. It involves not merely the care of the injured workman, but that of the wife and family, or other dependents, who are directly affected in almost every case. It reaches out beyond the hospitals and charitable institutions into the homes, where it interferes with the development and education of the children, and handicaps them at the very start. There are more than 3000

boys and girls in the various homes and children's institutions of the Pittsburgh district alone, and approximately 15 per cent. of them are there as a result of industrial accidents and trade diseases ("Children's Institutions and the Accident Problem," by Miss F. L. Lattimore. The Survey, Sept. 3, 1910.) How many more are spending their days in shops and offices instead of under normal home and school influences, cannot be even approximated.

A discussion of this sort naturally falls into two general divisions—the man and the machine—that is, the education of the workmen to make use of safety devices and to exercise care and prudence in dealing with the dangers to which they are necessarily exposed, on the one hand, and the application of mechanical devices, such as gear covers, railings, arrangements for quickly stopping machinery, etc., on the other. There is a third element worthy of brief mention, as it is a serious one in some cases, and that is the cost of carrying out safety recommendations.

Financial Considerations

A case was recently brought to my attention where a factory inspector in one of the Western States called for safety devices in one plant which would require the expenditure of \$70,000. This would have paralyzed the resources of the small organization that owned the plant, if the order had been rigidly and promptly enforced; but an arrangement was made whereby the work could be carried along gradually, relieving to a certain extent the financial burden that otherwise could hardly have been carried.

Within the United States Steel Corporation, however, this consideration has not entered seriously into the task of the safety inspector. Several years ago Judge E. H. Gary, chairman of the board of directors, expressed his hearty sympathy with the movement, and stated that every practical suggestion for bringing about safer working conditions for the men would be approved by the finance committee, and that there would be no hesitation in authorizing necessary appropriations to carry on the work.

This involves large expenditures. Automatic engine stops in the mills of the American Steel & Wire Company (which constitutes only about one-seventh of the entire corporation) have cost approximately \$50,000, and its equipment of automatic stop valves in boiler plants amounts to about \$100,000 more; \$6,200 was appropriated for placing a walkway on the side of an open hearth building, to allow the crane boys to escape quickly in case a ladle of hot metal should be spilled; a subway under railroad tracks, to enable workmen to reach a mill without the risk of crossing these tracks, amounted to \$12,000. In another plant \$30,000 was appropriated for placing overhead walks and runways for the use of window-cleaners and electricians.

In considering the question of mechanical safeguards I will describe in detail three different devices that may serve as illustrations of what is being done along this line.

Automatic Stops for Power Driven Machinery

The first installations of this kind consisted of an arrangement for closing the steam valve of an engine, controlled by electric push buttons placed at various convenient points throughout the mills; all that was required to stop the machinery in an entire department was the touching of a button, as one would ring a door bell. Where a man is caught in power-driven machinery the extent of his injury is likely to be in direct ratio to the time that elapses before the machinery can be stopped and the man released, and the push button stop system seemed to be an admirable method of preventing or limiting such accidents.

About 100 large engines in the plants of the American Steel & Wire Company have been equipped with these

*Paper presented before the National Conference of Charities and Correction, Boston, June 13, 1911.

†Chief Safety Inspector of the American Steel & Wire Company.

stop systems, and they have proved valuable in many cases. There is a condition, however, that is not at first apparent, but which has an important bearing on the question of engine safety stops, and that is the effect of the flywheel with which practically all such engines are equipped. There is enough energy stored in one of these large flywheels to keep the machinery in motion anywhere from 20 to 30 seconds up to $1\frac{1}{4}$ min., or even more, after the main valve has been shut and steam cut off. Most of the shafting driven by these engines runs at high speeds, from 100 to 200 or more r.p.m., so it will readily be seen that the man who is being carried around a shaft, or who is being drawn into a machine, cannot put much dependence on the engine being checked in time to save him, by means of the push-button stopping-device.

The use of electricity for driving mills and factories simplifies the problem considerably. Electric motors are usually installed in smaller units, which are easier to control, and they have practically no flywheel effect. That is, under similar conditions, a motor will come to a stand-still in a much shorter space of time after the electric current has been cut off, than is required by an engine after the steam valve has been closed. From this it will be seen that electric power is safer and more easily controlled than the older form of steam power, which it is gradually displacing, and push-button systems are most effective for shutting down electric motors.

In the use of stop buttons for both engines and motors, however, dependence is placed on a third factor, which is of a decidedly variable nature, and that is the man who shall push the button. When an accident does occur, this man may be absent altogether; he may be looking the other way—or he may even become excited (as has happened in two cases which have come under my own observation) and run away to find his "boss," without doing anything to help the fellow who is in trouble. Obviously, something more is needed that will work swiftly and surely in case of emergency, and in which the minimum of human uncertainty enters.

This can be accomplished in most cases by the use of a lever or rope which a man's body will strike when he is caught, and automatically stop the machinery, without requiring any voluntary action on the part of himself or any one else. We have a number of cases on record where there is no doubt that one of these devices prevented what would otherwise have been a serious accident. They work so quickly that if any injury is inflicted it is slight, and in some instances the man has escaped entirely unharmed. This seems like the last word on the question of automatic stopping arrangements, and the principle can be applied to almost any machine where there is the unavoidable risk of an operator being caught.

Ladder Protection

Another important item in the work of accident prevention is the protection of ladders. A ladder seems like the most simple and harmless piece of equipment that could be devised, and yet no accident list is complete without a generous contribution from this source. A committee of the National Manufacturers' Association, which made a special study of accidents in foreign countries last summer, is responsible for the statement that almost 20 per cent. of all industrial accidents in Germany can be attributed to falls from ladders.

When we consider that there are numerous vertical ladders in our industrial establishments of 40, 50, 100, or even 200 ft. in height, and that the slipping of a hand or foot from a rung of one of these ladders, the breaking of a worn or defective part, a little dizziness, the "loss of nerve" which a man who made a business of repairing chimneys once described to me—when we consider that any one of several causes which would be of no consequence to a man on the ground may mean certain death if he is at the upper end of a high ladder—we are not surprised at the prominent place ladder accidents occupy in casualty records.

This risk was early recognized by the men interested in accident prevention in the Steel Corporation, and the first preventive measures consisted in substituting steel ladders for wooden ones. A steel ladder is practically indestructible, and the rungs do not wear or break as they do when made of wood.

Ladders which are carried by the men from place to place add a notable element of risk, for various reasons.

A pile of material may be found in the location where the ladder should be placed, so that it is erected at an unsafe angle; the floors may be of concrete or metal plates which offer an insecure bearing for the foot of an ordinary ladder; the weight may be unevenly distributed, so that the ladder tips or swings out of place. Thus where a portable ladder is used there is not only the danger of a man falling from the ladder, but the added possibility of the ladder falling with the man.

To improve this condition, portable ladders have been shod at the foot with sharp steel spikes, and various combinations of safety, non-slipping feet have been designed.

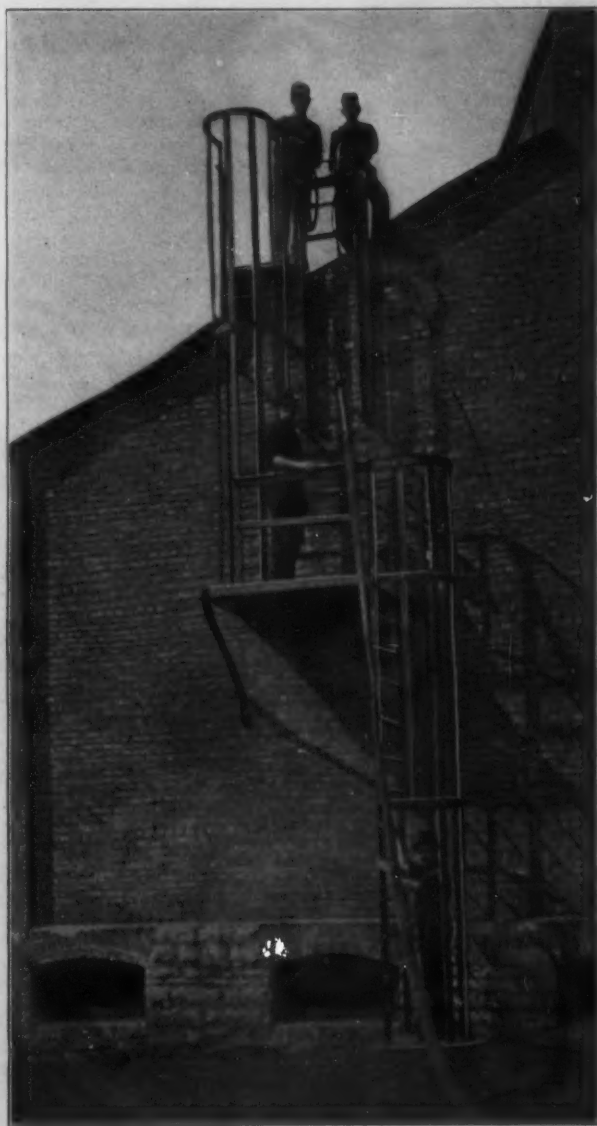


Fig. 2.—A Safety Cage Ladder.

These expedients, however, are merely palliative and do not really get down to the root of the danger. It is possible, in many cases where portable ladders have been used, to erect platforms and walks from which the men can work with perfect safety. It is often possible to replace a ladder with a stairway which the workman can ascend and descend comfortably and without risk, even when carrying tools or repair parts as is sometimes necessary.

There are certain locations, however, where there is not sufficient space to erect a stairway, and a vertical ladder seems to furnish the only possible solution. For such cases a "safety cage" has been designed which largely reduces the danger. This cage consists of several parallel bars fastened by bands to the ladder proper, so that, in effect, they make a tube about 2 ft. in diameter through which the man climbs. If his hand slips from one of the rungs his shoulders merely drop back a few inches until they strike the bars. It would be possible for an armless man to go up or down such a ladder, using only his feet on the rungs.

There is still a remote possibility of hands and feet both losing their hold at the same time, resulting in a

fall downward through the inside of the inclosure—so the further expedient has been adopted of placing landings at intervals of 10 to 15 ft. which would break such a fall, and limit the space through which any one could drop, irrespective of the length of the ladder.

To summarize, the policy which has been adopted by the American Steel & Wire Company for reducing ladder accidents is as follows:

First: The use of stairways wherever possible in place of fixed ladders.

Second: The application of safety cages to ladders of this type which must necessarily be retained, breaking long ladders by suitable landings which would limit the distance a man could fall.

Third: Cutting down the use of portable ladders by installing permanent platforms and walks for oiling, and operating valves, etc.

Fourth: Where portable ladders cannot be done away with, having them equipped with spikes or safety feet.

By these various means we are reducing accidents of this sort to a minimum and will almost entirely eliminate this class of hazard.

Safety Hand Leathers

In the wire mills men handle heavy bundles of rods and wire, which become more or less heated in passing through the dies. In order to protect their hands while engaged in this work, they use "hand leathers," consisting of a loose flap of leather with a strap across the back of the hand to hold it in position. This leaves a free end



Fig. 3.—Safety Hand Leathers for Wire Workers.

to the leather, which hangs down from the hand, so that it is liable to be caught in the machinery and draw the operator in after it.

Many experiments were tried before anything was found that would satisfactorily overcome this danger, but it was finally achieved in the following way—the strap which holds the leather is cut in two and the loose ends joined by a small coiled spring; a piece of rubber or other flexible tubing is placed around the spring so that it will not chafe the hand of the man using it. This one simple device will, undoubtedly, save one or two lives and several serious injuries in the wire mills every year.

(To be continued)

The schedule of the Brown-Ketcham Iron Works, Indianapolis, filed under the receivership recently instituted, shows assets of \$1,022,639 and liabilities of \$520,207. The Indianapolis plant is valued at \$121,352, the Huff plant at \$70,400, machinery and tools, \$372,750; merchandise and material on hand, \$81,368; patterns and flasks, \$13,095. The debts due on open accounts, mostly unpaid balances on contracts in various parts of the country, are \$317,455. The money on hand is \$34,500. An indebtedness, originally to Hathaway, Smith, Folds & Co., Chicago, but now to 15 banks, is \$190,000; to the Lackawanna Steel Company, \$126,150; to Indianapolis banks, \$95,000. Of the total liabilities \$154,693 is reported secured by liens; unsecured claims, \$274,293.

The Dentler Mfg. Company is building at Warwood, Wheeling, W. Va., a brick and steel plant 65 x 75 ft., to contain a 3-ton Carr patented portable furnace for the manufacture of sash weights, counterbalances, grate bars, etc. The plant will be ready for operations July 15. W. L. Dentler is president and Charles E. Lynn is secretary-treasurer.

Furnace Slags in Concrete

The Carnegie Steel Company, Pittsburgh, Pa., has issued an important booklet entitled "Furnace Slags in Concrete." It gives the details of a series of tests to determine the practicability of blast furnace slags for use in concrete. It is pointed out that over 10,000,000 tons of this slag are produced annually in the United States. While until recently the material was considered a waste product, in recent years it has become a valuable material, and, in the light of recent developments, the most important use is as a base in Portland cement. The booklet deals with the subject with a great deal of care. A chapter each is given to materials and mixtures, and voluminous tables deal with the average weights of concrete, the relation of the volume of concrete to the volume of aggregate, the approximate weights of slags, chemical analyses and granulometric analyses. The results of the tests are most instructive, being taken up under the headings of gravel, bank slag, machine slag, limestone, river sand and slag sand. Of especial interest is a summary of the minimum, maximum and average results, pounds per square inch, of the tests of concretes.

Tests of Metals, 1909.—The report of the tests of metals and other materials for industrial purposes made with the United States testing machine at Watertown Arsenal, Mass., during the fiscal year ended June 30, 1909, is for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C. The price for the full set of three volumes is \$6.85.

The National Metal Trades Association has issued the synopsis of the proceedings of the thirteenth annual convention, held at the Hotel Astor, New York City, April 12 and 13. The 268 pages of the volume contain much that is of interest, for the meetings included many features of importance to the metal industries.

At the annual meeting of the stockholders of the Westinghouse Machine Company recently held in East Pittsburgh, Pa., directors were re-elected as follows: J. D. Callery, H. M. Brackenridge, William H. Rea, T. L. Brown, John S. Wallace, New York; Horace E. Smith, Philadelphia; H. H. Westinghouse and George Westinghouse. John R. McCune, New York, was elected to fill the place of H. C. Baughman, who resigned.

The Pittsburgh Crucible Steel Company, which is an identified interest of the Crucible Steel Company of America, will shortly place contracts for the building of six 65 or 75-ton open-hearth furnaces and a 40-in. blooming mill at Midland, Pa. While it is likely that the company will erect finishing mills, plans for these have not yet been made.

"Apparatus and Methods for the Sampling and Analysis of Furnace Gases" is the title of a 22-page pamphlet by J. C. W. Frazer and E. J. Hoffman, issued by the Bureau of Mines, Department of the Interior, Washington, D. C. It describes the apparatus and methods used by the authors in connection with certain investigations of the Technologic Branch of the United States Geological Survey, especially those bearing on the improvement of furnace conditions and on efficiency in the use of fuel. The apparatus is fully illustrated.

The American Railway Association reports that the number of idle cars has decreased 3,800 in the two weeks intervening since the previous report. The surplus of coal cars decreased from 73,462 to 72,885, while the number of box cars remained practically stationary.

The Co-Operative Flint Glass Company, Beaver Falls, Pa., manufacturer of blown and pressed table and drug-gists' glass ware, jars, lamps, etc., is improving its plant by repairing furnaces, installing presses and band saw, lathes, shaper and other equipment, for which contracts have already been placed.

The Homestead Valve Mfg. Company, Pittsburgh, Pa., has appointed as its agents in Scranton, Pa., and vicinity, Charles B. Scott & Co., 119 Franklin avenue, who will carry a stock of its valves.

Detecting Adulteration of Oils

New Method Discovered for Determining Oil Adulteration by Mineral or Resin Oil

BY ALEXANDER E. OUTERBRIDGE, JR.

When examined by reflected light, hydrocarbon oils (improperly named "mineral" oils), whether crude or partially refined, show a peculiar greenish tinge commonly called "bloom." When examined by transmitted light the bloom disappears and the true color of the oil is seen. This color ranges from dark red or mahogany tint through various shades of orange and yellow up to "water white," according to the degree of refinement. Resin oil possesses the same peculiar characteristics, except that the color of the bloom is pure blue. Its chemical composition is so nearly like that of a hydrocarbon oil that these resemblances appear to me to be more than accidental coincidences and suggest the possibility of a common origin between so-called mineral oil and resin oil. This speculation, however, is not germane to our topic, which has to do strictly with a new practical application of that property commonly called bloom to the instantaneous detection of adulteration of vegetable or animal oils with hydrocarbon oils.

Fluorescence of Certain Oils

Doubtless everyone has noticed the bloom in mineral oils and wondered perhaps as to the cause of this singular greenish appearance, which is especially noticeable in crude oil and in heavy lubricating oils. Bloom is merely a popular name for a remarkable property possessed by a number of substances, the scientific name for which is "fluorescence." In simple non-technical words, fluorescence is a property inherent in some substances of becoming self-luminous while exposed to certain rays of light known as "ultra-violet" or "actinic" rays. These rays are always found in sunlight and in some forms of electric light.

In the course of my investigations I found that the greenish bloom of fluorescence of mineral oil and the blue bloom of resin oil noticeable in daylight can be enormously intensified or magnified, perhaps a thousand fold, so that, if a single drop of mineral oil be placed in a vessel containing a hundred or even a thousand drops of pure linseed oil, or any other non-fluorescent oil, its presence may be instantly detected by the greenish fluorescence which it imparts to the whole of the oil. The same is true of resin oil, which gives blue fluorescence. The utilization of this observation for practical purposes of detecting adulterations is the gist of this paper.

By preparing standard samples of any non-fluorescent oil containing one-tenth, one, two, three per cent., and upward, of mineral or resin oil, in clear glass test tubes placed in a suitable frame against a dark background, each showing readily and unmistakably the increasing proportions of the adulterant under a light giving ultra-violet rays, a "fluorescent scale" has been established, somewhat similar to the well-known carbon color scale used in steel foundry laboratories for quickly determining, by color comparison, the proportion of carbon in an acid solution of steel.

I am prepared to make unhesitatingly the broad assertion without fear of contradiction that there is no method known by which the presence of either mineral or resin oil in any non-fluorescent oil in small or large amount can be so disguised as to be undetectable instantly by this method, and this certainly is an interesting and important fact of considerable practical value to consumers of costly oils.

Test Applicable to De-Bloomed Oils

Methods of chemical treatment of mineral oil have been discovered to "de-bloom" mineral oil so that it can be used with impunity, so far as the bloom is concerned, as an adulterant for expensive vegetable and animal oils, and I learned that there is a very large trade in de-bloomed oils for this purpose. Samples of de-bloomed oils of different grades and colors were obtained. They are free from bloom in bright sunlight

or ordinary diffused daylight, or in the light from an ordinary electric arc, but when subjected to the kind of light which I shall presently describe they all became highly fluorescent, and even the proportion of adulteration with de-bloomed mineral oil in any specimen of non-fluorescent oil mixed with such de-bloomed mineral oil may be stated. I anticipate that this positive statement now made for the first time will cause some consternation among makers of de-bloomed mineral oil.

If both mineral oil and resin oil be used in combination as adulterants, it becomes more difficult to make quantitative determinations instantly by the fluorescent method; hence the qualification implied in the word often. But "practice makes perfect" in many operations, and this is no exception to the rule.

How Fluorescence Is Obtained

It is the ordinary inclosed arc, so commonly used in industrial works by reason of its relative economy, that happens to give out rays of the exact wave lengths needed to enormously increase the fluorescence of these oils. If the plain glass cover of this light fits properly, so that air does not enter as rapidly as it is consumed, the arc burns in a partial vacuum or, at least, the air is rarified and, under these normal conditions, this light shows continuously, after burning a minute, a faint rosy light in addition to the powerful white light. If now a vessel containing any mineral oil, crude or refined, or any resin oil, be placed in the path of these rays the most intense fluorescence appears, even in daylight, greenish in the case of mineral oil, blue in the case of resin oil, thin films glowing in the same manner. So strong is this fluorescence that I have even detected 1 c.c. of crude mineral oil in 999 c.c. of non-fluorescent oil.

I have examined a large number of vegetable oils, such as cotton-seed oil, corn oil, China bean oil, China wood oil, etc., and have not found a trace of fluorescence in any of them. It is stated in some textbooks that "oleic acid," which is found in lard oil, is fluorescent. On examination I find that pure white strained lard oil is entirely free from fluorescence under the ultra-violet ray, but all of the samples of so-called No. 1 or No. 2 lard oil (sold for use in machine shops) examined possess some fluorescence, and this may prove to be a novel means of rapidly determining the proportion of oleic acid in lard oil, though I only suggest it tentatively, not having studied the matter carefully from this point of view. The slight fluorescence of ordinary lard oil is different in appearance from that of mineral oil or resin oil, and does not materially interfere with the application of the fluorescent test for its adulteration with mineral or resin oil.

Simple Scheme of Testing

In daily practice I have found it convenient to put the standards in narrow tubular oil-test bottles holding about 50 c.c. each; these are corked, labeled and placed side by side in small wooden racks (like test-tube holders) on a shelf in proximity to an inclosed arc light, beginning with pure oil at the left-hand side. Then a similar sample containing 0.1 per cent. of mineral or resin oil, as the case may be, then 1 per cent., and so on, increasing by single percentages up to 10 per cent. It is advisable to prepare several different series of standards with fluorescent oils of different grades. Crude mineral or resin oils are much darker in color than refined oils, and the color by transmitted light is a guide to the kind of oil that has been used for adulteration and is consequently an indication of the proper standard series to be used for comparison in making a quantitative fluorescent analysis.

It is not necessary to prepare standards for each kind of vegetable or animal oil; thus, the standard series prepared with linseed oil serves for examination of cotton-seed oil, corn oil, China wood oil, China bean oil or any other non-fluorescent vegetable oil. It is necessary, however, to prepare special standards with lard oil for testing adulterated lard oils.

The compounding of core oils has become a large business and nearly all samples that have come to my notice contain mineral or resin oil or both. Neither of these oils impart any valuable properties to core oils, but are used simply to dilute more costly oils; and, in point of fact, they are positively deleterious,

being of a non-drying nature, impairing the good oil binder and requiring more fuel and a longer time for baking the cores in the ovens.

I have found that "Soya" oil expressed from beans grown in enormous quantities in China and elsewhere is an excellent substitute for linseed oil for making cores if used in its natural state, without having been compounded or adulterated by core-oil makers. It costs about 60 cents per gallon for finer grades. The very best substitute for linseed oil as a binder for oil cores that I have discovered is crude whale oil, costing about the same as Soya oil, the only objection to its use being an unpleasant fishy smell which escapes from the core ovens during the baking of the cores. It makes a splendid binder. Cotton-seed oil is used for the same purpose, but so much larger proportion of oil to sand is required that there is little economy in its use as compared with the other vegetable oils.

A simple and practical test of the value of core oils is to make a dozen companion test cores $1 \times 1 \times 15$ in. from batches of pure linseed oil and sharp sand, and also from the same proportions of any other oil and sharp sand. These are placed side by side on an iron plate and baked under precisely the same heat conditions. When cold they are broken on a transverse testing machine with supports 12 in. apart. The relation between the average strength of the two sets of test cores is a measure of the binding qualities of the oils.

Lifting Magnets in Foundries*

Economies Resulting from Their Application in an Industry Which Has Been Slow to Accept Them

BY H. F. STRATTON, CLEVELAND, OHIO

An analysis of figures relating to the tonnage and the cost of handling the pig used by the foundries in this country, seems to indicate that the lifting magnet is becoming an economic necessity to foundries producing a large proportion of the total foundry tonnage. There appear to be three huge businesses which can profitably use lifting magnets for the transporting of iron and steel products:

First is the steel industry, with probably 10,000,000 tons annually which can be economically handled by the magnet, and in this industry the magnet found rapid and extensive use, with savings to the steel mills of probably close to \$1,000,000 annually. Second, the railroads have discovered that magnets are large money savers in the handling of their scrap material, and probably 100 lifting magnets are at present in use at the scrap docks operated by the various railroads throughout this country. In several cases the economies effected by the use of magnets in handling railroad scrap have proved to be so large and so obvious as to warrant the installation of very complete equipments, consisting of special cranes, several magnets, and a convenient and scientifically arranged collection of bins, shears, etc. A quotation from a paper by F. D. Reed, assistant to vice-president of the Chicago, Rock Island & Pacific, will give a summation of this matter. "Sorting of scrap, the way we handle it here, can be done for 4 to 7 cents per ton; in other words, we can handle scrap in and out with our facilities for 10 to 12 cents per ton, including the sorting. Prior to May, 1909 (at which time our crane and magnet were installed), when all scrap was handled by hand, the cost per ton in and out ranged from 30 to 35 cents per ton, which is about what it is costing any railroad to-day that is handling scrap by hand, or even with very good modern facilities for handling, and to keep it down to this figure the railroad must have good and convenient scrap-dock arrangements and efficient organization."

Magnets in the Foundry

The third industry, which would appear to have opportunities to effect savings by the use of magnets, is the foundry. It has been estimated that the foundries of this country melt annually about 6,000,000 tons of pig iron

and scrap, and although the writer has no definite knowledge of the relative proportions, it would seem reasonable to conclude that of this total about 1,000,000 to 2,000,000 tons is represented by scrap iron and steel.

Of these three-named industries in which the lifting magnet can apparently be used to economic advantage, the foundry has been by far the most reluctant to embrace or even to investigate the economies which are apparently open to it.

An analysis of the costs can be best undertaken from the separate considerations of cost of installation and cost of operation. A magnet thoroughly capable of withstanding hard abuse costs about \$1,300 per ton of lifting capacity of pig iron. Standard magnets are constructed in about four different sizes, and although this figure just named does not hold accurately for all sizes, yet it is a fairly close index to the selling price and is sufficiently accurate for purposes of estimate. It may be mentioned at this point that the approximate lifting capacities of these different sizes of magnets in service are, expressed in pounds of pig iron per lift, as follows: 800, 1350, 1950, 2400.

Of course, some kind of a crane is necessary for handling a magnet, and if the foundry already has its yard equipped with either an overhead traveling crane or a locomotive crane, the installation of the lifting magnet becomes a simple and relatively inexpensive matter. If it be applied to an electric overhead traveling crane, it is merely necessary to run leads from the crane to the magnet, and to provide some simple mechanism for taking up the slack in these leads as the magnet is hoisted. If the magnet be applied to a locomotive crane, current can be furnished to the magnet either by suitable plug stations installed at various points in the yard, or an engine taking generator set can be put on the crane, the generator delivering current to the magnet and the engine taking steam from the boiler of the locomotive crane. This latter arrangement, while more expensive in first cost, is preferable in that it provides a flexible unit which is operative at any place which the locomotive crane can reach.

A high-grade four-wheel ten-ton locomotive crane, complete with an engine generator outfit, can be installed at an expense of about \$5,500, and such a crane will handle a magnet at a boom radius of about 40 ft., thereby covering a large area, even if the crane runs on only one track. Of course, by the use of parallel spurs, a large area can be conveniently, cheaply and completely served by the locomotive crane. A locomotive crane is of such general use to a foundry that it is only fair to charge but a portion of its cost to the magnet. The locomotive crane can, for instance, be used for loading and unloading heavy castings and machinery, and for shunting freight cars. For about \$1,000 extra it can be equipped with a two-line outfit and a bucket for unloading sand and coal. If we consider that \$3,000 be a proper proportion of the locomotive crane cost to charge against the magnet, and if a magnet be selected of such size that it will have a lifting capacity of about 1350 lb. of pig iron, the cost of the magnet installation then becomes about \$3,900, or, in round figures, \$4,000, installed and ready to operate.

The Operating Cost

The operating cost of a magnet consists of "certain charges, including operator's wages, fuel and oil, which will exist only when the magnet is in operation, and depreciation charges on the equipment which will not depart much annually from a fixed amount, whether the tonnage be sufficient to keep the equipment busy practically all the time or only an hour or two a day. It follows, then, that the operating cost, which is the sum of these two charges, will necessarily be lower per ton of material handled if the equipment can be kept in service the majority of the time. Most foundries, however, do not melt sufficient metal daily to require the services of the magnet more than two or three hours per day.

A concrete case will be selected for the double purpose of indicating how similar estimates may be made to cover any particular foundry, and for pointing out a daily tonnage at which the installation of the magnet and crane appears to be an economic necessity. The assumption will be made that a foundry melts 35 tons of metal daily, 300 days in the year. All of this metal must, of course, be handled twice; that is, it must be unloaded from

*Presented before the American Foundrymen's Association, Pittsburgh, May 25, 1911.

the car to piles and loaded from the piles to some kind of a wagon on which it is carried to the cupola platform. For a foundry of this capacity the following figures pertain:

Charges per Hour.

Operator's wages.....	\$0.30
Fuel (at \$3 per ton and using ½ ton per 10 hours).....	.15
Oil, etc.....	.03
Total	\$0.48

A crane and a magnet of the size referred to before will conservatively handle 35 tons per hour, which will make a cost of 1.4c. per ton. The annual depreciation on the \$4,000 equipment at 12 per cent. would be \$480, and as 35 tons handled twice per day for 300 days represents 21,000 tons handled annually, the depreciation cost on this tonning basis is 2.3c per ton. This brings the total cost of handling, including wages, fuel, oil and depreciation, up to 3.7 c. per ton. The writer is told by a gentleman well versed in foundry practice that 10c. per ton is a fair figure to assume for the cost of loading or unloading pig by hand, and on this basis the saving would be \$1,323 annually, or 33 per cent. on an investment of \$4,000.

Magnets in the Large Foundry

If the case of a larger foundry be selected, melting, say 100 tons per day for 300 days per year, and assuming in this case that metal is handled more cheaply at, say 9c. per ton, by hand labor, the annual saving effected by the use of the magnet is \$4,080, or over 100 per cent. on the investment. It may be mentioned in the case of the smaller foundry that the time the magnet is in use daily would be about two hours, and in the case of the larger foundry, with the magnet selected, about six hours daily would be required. In this latter instance it would doubtless be more economical to install a magnet having a lifting capacity of about 1950 lb., instead of 1350 lb., which was the basis on which the estimates were made.

With these figures fresh in mind, attention is directed to this conclusion: A foundry melting 35 tons of metal daily can install both a crane and a magnet, and expect a return upon the investment, after allowing all charges, of more than 30 per cent. If it happens that a foundry is already equipped with either an electric or a locomotive crane, a magnet can then be installed on a very profitable basis when the tonnage to be handled is considerably less. For instance, if an assumption be made that a foundry melts 20 tons daily, and that a magnet be installed on an existing crane, the cost of the magnet being about \$900, then the cost of handling, per ton, including wages, fuel, oil and depreciation on the magnet, is about 2.3c., which would represent a saving in this foundry of about \$924 each year, or more than 100 per cent. on the investment.

Handling scrap, in general, will be more expensive than handling pig iron, whether it be done by hand or by magnet, but the advantage in favor of the magnet is more marked in the case of scrap than in the case of pig. As before stated, the railroads have carefully investigated the comparative cost of handling scrap and large castings by means of magnets and by hand labor, and the following information is therefore submitted as being pertinent to the question of scrap handling in foundry yards. N. A. Mears, of the Lake Shore & Michigan Southern, gives the following comparative figures:

Cost per Ton.

Loading locomotive tires by hand.....	\$0.17
Loading locomotive tires by crane with chains.....	.08
Loading locomotive tires by crane with magnet.....	.04
Loading heavy castings by hand, almost impossible.....	
Loading heavy castings by crane with chains.....	.20
Loading heavy castings by crane with magnet.....	.03

Another gentleman identified with the railroads states that it costs, for an average of 100 cars, \$7 per car to unload scrap by hand, and \$2.83 per car to unload the same character of scrap by crane and a magnet. Mr. Reed, of the Chicago, Rock Island & Pacific, says he can unload unsorted scrap with a magnet at 2 to 5c. per ton, and sorted scrap at ½ to 1½c. per ton. When this work was done by hand labor the expense was about three times as much.

Incidental Advantages

Exclusive of the economies already cited, incidental advantages, somewhat in the order of their importance, may be mentioned as follows:

1. The elimination of labor trouble, this being particularly true where common laborers are apt to be very unreliable, as in the South; or where the demand for labor for harvesting the crops is extraordinary at certain times of the year, as in the West.

2. The ability of a lifting magnet to handle a drop ball for the breaking of castings too large to charge into the cupola. For this application the magnet not only serves to lift and release accurately the ball, but also to pick up and transport the broken pieces of the casting. For this particular work, not only is the matter of economy to be considered, but also the question of increased safety to the operator.

3. The ability of a magnet to unload castings too heavy to handle by hand, and often of such shape as to be very inconveniently handled even by a crane with chains.

4. The ability to stock pig and scrap in piles higher than would be possible were hand labor employed, and thereby make more efficient use of the available space in the foundry yard.

5. The ability to unload cars more quickly, and thereby save demurrage.

6. The recovery of small pieces of iron in the bottom of freight cars, which can be magnetically swept up, but which would be neglected if the cars were unloaded by hand. This figure is considerable in the aggregate, and has been as high as 700 lb. per car.

7. The convenient recovery of nails and iron shot in foundry sand. This is accomplished by slowly passing the magnet above the sand and as close to the sand as possible, and as it passes over successive portions of the ground the small iron and steel particles, mechanically associated with the sand, will break through their confinement and leap to the magnet bottom, where they will be held until the magnet is de-energized.

8. Independence of weather is particularly noticeable in the South, where the negro is temperamentally opposed to cold weather, and where difficulty is sometimes encountered in getting the common laborer to work out of doors during cold and inclement weather. The magnet, if anything, lifts more on a cold day than on a hot one, and will lift pig iron when covered by snow.

The Element of Danger

The question of safety is often raised, and during the time when the magnet was being commercially introduced its use was frequently combated on the score that it was dangerous to workmen. Of course, it cannot be denied that if a man is standing under a magnet that is carrying a load, and the circuit is interrupted, something is going to happen to that man. The writer maintains, however, that it is safer to use a magnet for the transportation of material than it is to use chains, and for several reasons: First, the magnet is inherently a labor-saving device, and when it is used the number of laborers in its vicinity is reduced, and frequently the magnet entirely displaces ground labor. Second, a laborer always looks upon a magnet with a high degree of suspicion, since there is nothing tangible to hold up the load, and he avoids getting under a load supported by a magnet more than he would under a load supported by chains; in other words, he uses more caution. Third, the accidental opening of the magnet circuit probably does not occur as often as the breakage of chains supporting a load.

Manganese bronze should, in the opinion of a committee of the American Society for Testing Materials, investigating nomenclature and other things of non-ferrous alloys, be the term applied to metal conforming to the following limiting analysis: Copper, 55 to 60 per cent.; zinc, 39 to 45 per cent.; iron, not over 2 per cent.; tin, not over 2 per cent.; aluminum, 0.5 per cent.; manganese, 0.5 per cent. The foregoing is a proposed standard definition on which the society has not yet taken a vote.

The furnace of the Robeson Iron Company, Ltd., Robeson, Pa., will be blown out this week for relining and repairs. It has been running a little over two and a half years. A new structural steel and cement tile roof will be put on the cast house, and connections will be made to a new stove recently erected. The furnace will be blown in as soon as the various repairs are completed.

The Bullard Machine Tool Company, Bridgeport, Conn., has concluded arrangements with Harry Ellis, Jr., 1138 Mutual Building, Richmond, Va., for direct representation in the territory surrounding Richmond, extending to the West Virginia line.

Pure Irons from the Open Hearth Furnace*

The Method of Manufacture of What Is Regarded as a New Iron

BY DR. ALLERTON S. CUSHMAN

It is the object of this paper to present to your attention the important step in metallurgical development which has made possible a process for making irons of extraordinary purity on the large scale usual in steel-making operations in the open-hearth furnace. Purity in a commercial product is difficult, if not impossible, to define, and it is necessary in the beginning to state emphatically that although the words "pure irons" in the title have been selected advisedly, there is no intention to go beyond the actual facts.

That the electrolytic theory of corrosion is now accepted, by the large majority of authorities both in this country and in Europe, as having left the realm of pure theory for that of fact, is shown by numerous very recent contributions to this subject. In the early days of these investigations experimenters found it extremely difficult to obtain samples or specimens of steel which were to any extent free from manganese, although, of course, many examples of charcoal and puddled wrought iron of a high degree of purity in this respect could be obtained.

Beginnings of Pure Open-Hearth Metal

About this time, however, a prominent American manufacturer, struck by the voluminous literature which had been appearing on both sides of the controversy, determined to make the effort to produce open-hearth metal of the highest possible commercial purity, which would be not only as free as possible from manganese but also from the other four chief impurities which have in the past been taken special note of in the manufacture of steel. This decision on the part of the manufacturer took the experimental work for the first time from a purely laboratory to a large mill scale of operation.

As this experimental work proceeded, the material at first produced was simply a low-manganese mild steel; and while the movement was decidedly in the right direction it was only a step forward and the product obtained was not very essentially different from mild steels that had been produced elsewhere from time to time. When, however, in following up this work the attempt was made to eliminate the manganese and carbon completely from the metal, the resulting ingots were of such an oxidized character as to be entirely unsatisfactory and to lead to most serious troubles in the attempt to roll and manufacture it into a final product. In fact, material made at this stage of the progress of the investigations was not pure iron and was of little utility.

It has been the usual practice in the past to apply the term iron when used in its specific sense only to the products of either the charcoal knobbling fire or the puddling furnace, although, the product of the busheling or fagoting method of production has also yielded material which has managed to masquerade as iron. In conjunction with the results of chemical analysis, the microscope has recently been developed as a means of enabling the metallurgist to easily distinguish iron from steel. These methods of investigation have gradually led to considering iron to be a name applicable only to products which show slag inclusions under the microscope. Steel, from the very nature of its manufacture, does not exhibit this peculiarity, and it is not surprising, therefore, that the mere presence or absence of slag should gradually have come to be held as the distinguishing characteristic between steel and iron.

Border Line Between Iron and Steel

The practical production of a new form of the metal, by a process in which the product was finished in the molten condition and cast into molds, necessarily yielding a slagless body, has reopened the question in some quarters as to whether or not the claim is justified that these pure forms of metal should be called iron and not steel. From the purely scientific standpoint, when we use the

word iron, we must inevitably refer to a product which in all of its characteristics essentially corresponds to the element itself. It was, of course, impossible to decide just where the border line between an iron and a steel should lie, until the results of metallographic investigations which have been made within the last few years had taught us the essential difference between the pure ferrite structure and the carbon-iron steel.

From the modern standpoint, neither the presence nor absence of slag could be held to settle the matter of nomenclature, except that the presence of slag inevitably points to the process by which the material was prepared. In the opinion of the writer, it is difficult to understand how a product which is in every way essentially metallic iron and exhibiting a true ferrite structure, could be defined as steel after the carbon had been eliminated to practical traces irrespective of whether the metal is found to contain inclusions of slag. In fact, a metal which contains 3 per cent. or more of a foreign body such as slag falls just that far short of being pure iron, and from a perfectly reasonable standpoint it would appear that after the carbon-iron alloy field has been eliminated, the nearer the metal approaches to the theoretical constitution of the element itself, the more it justifies the name of iron.

Justification for the Name Ingot Iron

This pure iron made in an open-hearth furnace has become generally known in this country and to a certain extent in Europe as "ingot iron." This term, as we are well aware, originated many years ago and was applied chiefly to the lower carbon product of the Bessemer converter and the open-hearth furnace. Of late years, however, it has fallen into disuse and from the standpoint of the steel maker it was undoubtedly a misnomer, so that gradually the term mild or soft steel took its place. Low-carbon Bessemer or open-hearth steel which usually carries from 0.3 to 0.5 per cent. of manganese or over is not iron, for the simple reason that it does not show the true ferrite structure and contains enough carbon to provide it with mild hardening qualities. Besides these facts, mild steels possess many qualities not possessed by iron and may be used for purposes for which iron would be unsuitable, although this applies more especially to the slag-bearing iron as made by the original processes. On the other hand, a pure slagless iron is probably superior for many other purposes to the general run of carbon-bearing metals. It would appear that the term "ingot iron" is especially suitable to a pure iron product made in an open-hearth furnace and cast while molten into ingot form.

The Copper in the Metal

Practically all the scrap available in this country carries copper varying from very small quantities to amounts in some cases exceeding one per cent. A great many conflicting statements in regard to the influence of copper upon iron have appeared in the literature, but in most cases it appears to have been considered an undesirable element, imparting the property of red shortness to iron or steel. When present in considerable quantities, this is unquestionably the case, and when accompanied at the same time with sulphur the effect is highly intensified. In very small percentages copper does not seem to appreciably affect the working or rolling of the product.

Quite early in the investigation with which the writer has been associated, it was found that certain quantities of copper when added to steel would very appreciably retard the solution of the steel in dilute mineral acids. This was also found to be true, though to a much less extent, with the carbon and manganese-free product of the open-hearth furnace, for the resistance to acid attack is to a large extent influenced by the purity of the metal. In fact, the presence of oxygen in the metal has been found to be more responsible than that of any other element as far as the much-discussed question of acid resistance is concerned. In the writer's experience and practice, the question of copper in iron has been given very careful attention; a wide range of heats have been made, which have purposely been given increasing quantities of copper up to as high as 1.5 per cent. These iron-copper alloys were of necessity made on the usual large scale of operation, but no particular difficulties were encountered in rolling or finishing them. It should not, however, be understood that the intention has been to have copper present in these purer forms of open-hearth irons, for, on the contrary, even though it should appear that the pres-

*From a paper read at the annual meeting of the American Society for Testing Materials.

ence of copper within reasonable limits is no detriment to the product, the effort would still be strenuously made to reduce the percentage of copper to the lowest possible point.

If the selling price of the product was commensurate with the expense attendant on securing metal entirely free from copper, there is no reason why such irons could not be readily produced, but it would immediately render useless for the purpose much of the pig iron and most of the scrap at present available.

The Treatment of the Metal in the Furnace

The manufacture of pure iron in open-hearth furnaces in its entirety is undoubtedly a distinctly new development, in spite of the fact that the process has a great many points in common with the open-hearth production of mild steel. In the case of the iron the oxidizing operation under highly basic conditions is carried forward to an abnormal extent. It is not too much to say that the effort is made to do what has generally been conceded to be bad practice in an open-hearth furnace, that is to say, the metal is deliberately over-burned. This treatment yields a bath of metal and slag heavily charged with gas and in a highly super-oxidized condition. The elimination of the carbon and manganese to such low percentages that they amount to no more than traces makes this super-oxidation a necessary step in the process.

Having obtained the desired purity with respect to these elements the bath is given a heroic treatment,* whereby a thorough deoxidation takes place, the gas being at the same time satisfactorily eliminated. No difficulties of any importance are encountered in the pouring of the metal into the ingot molds. It would naturally be expected that such treatment as described might yield a wild metal difficult to handle in the pouring, but this is not the case if the work has been satisfactorily performed. As a matter of fact, the resulting ingots of this process not only possess great purity but are as free from oxygen and gas as any ingots produced from well-made mild steel.

Large Tonnage Possibilities of the Metal

The process is necessarily a more expensive process than that of soft-steel manufacture, owing to the necessary prolongation of the heat and the higher temperature required during the latter stage of the operation. For these reasons, labor, furnace repairs, ladle linings, fuel charges, and the item of metallurgical waste must all be necessarily in excess of those encountered in the making of soft steel. The process, however, holds forth the same tonnage possibilities as in the making of mild steel, and it permits of the making of iron on a basis comparable to the high-pressure methods employed in modern steel manufacture. It also, in contradistinction to the previous methods of iron manufacture, permits of the making of iron in very large masses, and the subsequent rolling of the same in a manner similar to that of mild steel. It is a well-known fact that the greater the amount of work that is given to iron or steel, the more superior will be the resulting product. This permits the making of commercial products out of iron that have been customarily made of steel owing to the steel's superior workability when compared with iron made by earlier methods.

Up to the present time ingot iron has not been manufactured into all the products that are customarily made of steel, and of charcoal and puddled iron, but it has been successfully and easily rolled into billets, slabs, plates, sheets, merchant iron, wire, nails, rivets, pipe and boiler tubes. A wide variety of forgings have also been produced.

TABLE I.—Analyses of Normal Ingot Iron.

	(1)	(2)	(3)	(4)	(5)	(6)
Silicon	0.003	0.002	0.005	0.004	0.006	0.003
Sulphur	0.014	0.015	0.019	0.017	0.018	0.014
Phosphorus	0.002	0.001	0.005	0.004	0.003	0.003
Carbon	0.009	0.011	0.015	0.02	0.016	0.008
Manganese	0.012	0.015	Trace	0.02	0.015	0.025
Oxygen	0.024	0.020	0.021	0.016	0.022	0.019
Copper	0.06	0.07	0.05	0.08	0.04	0.02
Aluminum	0.005	0.011	0.012	0.010	0.013	Trace
Nitrogen	0.006	0.004	0.005	0.003	0.005	0.007
Hydrogen						

The foregoing are a few analyses of normal ingot iron as it is being produced to-day, all of which serve to show the possibilities of this process in the production of pure

*It is understood that the author in his revision of the paper will explain the treatment at some length, involving as he mentioned at the meeting the addition of pig iron.

iron. The analyses are extremely accurate, the carbon and the oxygen being determined by combustion with the special care necessary in dealing with the determination of such minute quantities:

In tensile strength it closely approximates high-grade well-rolled charcoal iron, and in elongation and reduction of area it not only equals but in many cases surpasses the finest soft steel. It is a well-known fact that iron is usually inferior to steel in elongation and reduction of area. Owing to its more steel-like qualities in this respect, therefore, pure open-hearth iron becomes available for deep drawing and stamping purposes where very often ordinary wrought iron is unavailable and steel must usually be employed.

A New Baltimore Business Organization

A committee of prominent business men, called the Greater Baltimore Committee, was recently organized with the determination to greatly develop Baltimore and the State of Maryland industrially, economically, agriculturally and along other lines and to push Baltimore rapidly toward a million population. It is waging a vigorous campaign in arousing greater loyalty among the people at home and giving the widest possible publicity abroad to the advantages and activities of Baltimore. In this connection the committee, various trade bodies and the municipality will cooperate.

Edwin L. Quarles, formerly secretary of the Southern Commercial Congress and an expert on community development, is the director of the committee's work and has been especially emphatic and determined that this shall not be in any way considered as a spectacular "boom" or "boost," but that it will be carried along solid business lines to accomplish things that will be permanently constructive in their nature. Its aim is to stimulate investment of capital in local enterprises and new factories; find out the particular need for any one kind of an enterprise and then have it located; establish an industrial building in which all the commercial organizations in the city will have their headquarters; arrange for an "All Maryland Convention" in Baltimore for the purpose of arousing State-wide interest and development, etc. It is also intended to do publicity work through handsome books illustrating Baltimore and placing Baltimore newspapers in the reading rooms of hotels, commercial organizations and libraries throughout the country.

Charles H. Dickey, president of the Maryland Meter Company, who originated the idea and is very enthusiastic over the work, is chairman of the committee. Charles T. Crane, president of the Farmers' and Merchants' National Bank of Baltimore, is treasurer. Norman D. Parrott is secretary, as well as being an officer in several trade organizations. The executive committee is composed of the officers previously named and Mayor James H. Preston, ex-Mayor J. Barry Mahood, D. C. Ammidon, H. F. Baker, president of the Thomsen Chemical Company and of the Merchants' and Manufacturers' Association; Jacob Epstein, owner of the Baltimore Bargain House; William H. Fehsenfeld, president of the Travelers' and Merchants' Association; O. F. Hershey, a prominent lawyer; Jacob W. Hook, president of the Old Town National Bank; Joseph C. Whitney, president of the Merchants' and Miners' Transportation Company, and Herbert Sheridan, manager of the Traffic Bureau, Chamber of Commerce.

The Foreign Rail Trade.—Almost complete stagnation prevails in the rail trade, says the London Ironmonger, but some good-sized business is to be settled within the next few weeks, which it is hoped will come largely to British works. An order for 4000 tons of 90's for the Bengal Nagpur Railway has been placed with the Northeastern Steel Company, this being the only business which seems to have been actually put through, while there have not been any new inquiries about. The Longitudinal Railway of Chill has placed its order for locomotives, dividing it between the German firms of Henschel & Son and Koppel. British and American engineers tendered for the business, but they were much underbid by the Germans.

A. H. Baldwin, Chief of the Bureau of Manufactures, Department of Commerce and Labor, Washington, D. C., has issued "Foreign Tariff Notes No. 3," covering recent tariff changes in a large number of countries.

The Steel Corporation's Unfilled Orders

The monthly report of the United States Steel Corporation on the amount of unfilled orders, issued July 11, shows that on June 30 orders amounting to 3,361,058 tons were on its books, an increase from May of 247,871 tons. The improvement follows two consecutive months of decreasing totals. The new figure is 39,485 tons less than February, and 86,243 tons less than March. With the exception of these two months, the tonnage is larger than any month since August, 1910.

The following table gives the unfilled tonnage of the United States Steel Corporation by months since June 30, 1910, together with tonnage at close of each quarter from December 31, 1902, to June 30, 1910:

June 30, 1911.....	3,361,058	Dec. 31, 1907.....	4,624,552
May 31, 1911.....	3,113,187	Sept. 30, 1907.....	6,425,008
April 30, 1911.....	3,218,704	June 30, 1907.....	7,603,878
Mar. 31, 1911.....	3,447,301	Mar. 31, 1907.....	8,043,858
Feb. 28, 1911.....	3,400,543	Dec. 31 1906.....	8,489,719
Jan. 31, 1911.....	3,110,919	Sept. 30, 1906.....	7,936,884
Dec. 31, 1910.....	2,674,757	June 30, 1906.....	6,809,850
Nov. 30, 1910.....	2,760,413	Mar. 31, 1906.....	7,018,712
Oct. 31, 1910.....	2,871,949	Dec. 31, 1905.....	7,605,086
Sept. 30, 1910.....	3,158,106	Sept. 30, 1905.....	5,865,377
Aug. 31, 1910.....	3,537,128	June 30, 1905.....	4,829,655
July 31, 1910.....	3,970,931	Mar. 31, 1905.....	5,579,560
June 30, 1910.....	4,257,794	Dec. 31, 1904.....	4,696,203
Mar. 31, 1910.....	5,402,514	Sept. 30, 1904.....	3,027,436
Dec. 31, 1909.....	5,927,031	June 30, 1904.....	3,192,277
Sept. 30, 1909.....	4,796,833	Mar. 31, 1904.....	4,136,961
June 30, 1909.....	4,057,939	Dec. 31, 1903.....	3,215,123
Mar. 31, 1909.....	3,542,595	Sept. 30, 1903.....	3,278,742
Dec. 31, 1908.....	3,603,527	June 30, 1903.....	4,666,578
Sept. 30, 1908.....	3,421,977	Mar. 31, 1903.....	5,410,719
June 30, 1908.....	3,313,876	Dec. 31, 1902.....	5,347,523
Mar. 31, 1908.....	3,765,343		

The Wheeling Corrugating Company's Catalogue

The Wheeling Corrugating Company, Wheeling, W. Va., with offices at New York, Chicago, Philadelphia, St. Louis and Chattanooga, has issued a new catalogue, No. 290, devoted to sheet metal and sheet metal products. The volume is unusual because of the exceptional effort that has been made to give something of lasting value to the sheet metal trade. The character of the illustrations is noteworthy, as is also the arrangement for convenient inspection, that buyers may realize the company's ability to serve its customers to advantage. The seven half-tone inserts show the factory plant and the large rolling mill at Wheeling, W. Va., and the factories and rolling mills at Martin's Ferry, Ohio, and the pictures of the branch offices demonstrate the facilities to handle orders promptly.

The catalogue gives useful information in reference to the gauges and weights of sheet iron and tables showing the number of Crescent black sheets contained in a bundle and instructions as to the application of galvanized and painted roofing sidings. A complete line of corrugated sheets for use in connection with concrete work, the various brands of tin for roofing with the Wheeling old style tin plate, continuous roll roofing, metal shingles, eaves trough, ridge roll, conductor pipe and accessories for the roofer occupy some 80 pages.

Twenty-seven pages are devoted to metal laths and architectural metal work. Solders, ventilators, tinner's tools, stove pipe precede some 48 pages devoted to black and galvanized iron stamped ware and piece ware, including fire buckets, ash cans, wash tubs and measures. The catalogue closes with some 27 pages of Wheeling metal ceilings, including many attractive designs, as well as pictures of interiors where the Wheeling metal ceilings have been used. List prices are presented on all goods which are usually not sold on quotation.

The Railway Age Gazette of July 7 prints an article by Max H. C. Brombacher on "Application of Scientific Management to a Railway Shop," which was awarded the first prize of \$50 in the competition on that subject which closed June 15. Mr. Brombacher is a practical production or efficiency engineer at 94 West 183d street, New York City, whose name will be recognized by our readers in connection with the authorship of quite a number of articles which have appeared in these columns.

The Pittsburgh Bridge & Iron Works, Rochester, Pa., has made important improvements in its plant. These include an extension to the building and the addition of new machinery, which will increase the output at least 25 per cent. Other improvements are planned which will not be completed until fall.

Birmingham Notes

The furnace of the Shelby Iron Company at Shelby, Ala., one of the oldest in the district, has been blown out for repairs. This furnace has been operated on charcoal iron for many years.

Preparations are being made by the Sloss-Sheffield Steel & Iron Company for the blowing out of Hattie furnace at Sheffield, Ala., and the blowing in of Philadelphia furnace at Florence, Ala.

No. 3 furnace of the Tennessee Coal, Iron & Railroad Company at Bessemer, Ala., has just been relined and will take the place of No. 4 furnace at that plant, which is to be blown out for repairs. Two furnaces were blown in at the company's Ensley plant last week.

By reason of the increased activities at the plants of the Tennessee Coal, Iron & Railroad Company considerable additions necessarily have been made to the force employed, while the installation of machinery at the plant of the American Steel & Wire Company at Corey, Ala., which has been resumed, has afforded employment to some 2000 men.

The steel plant of the Southern Iron & Steel Company at Alabama City, Ala., has been closed down temporarily for repairs. The blast furnace will be kept in operation.

A British Handbook for Iron Founders

The Frodair Iron & Steel Company, Fenchurch House, E. C., London, England, has issued a "Handbook for Iron Founders" which must possess much value to manufacturers of castings, to whom it will be a volume for ready reference. In its 155 pages the subject is taken up in detail, including the different elements in pig iron, interaction of different chemical elements, the selection of irons for special castings, hints on cupola practice, blowing machines, chilled castings, cylinder castings and adding steel to cast iron in the cupola. Other chapters are devoted to the areas of round, square and rectangular pouring-gates, the arrangement and regulation of cupola blast, the relation between transverse test records and admiralty and standard engineer's bar, approximate (working) capacity of foundry ladles, judging temperature of molten iron by color and the approximate melting capacities of different cupolas. A number of pages are devoted to blank forms for the benefit of those who wish to secure analyses of Frodair iron. The handbook is carefully indexed.

A lecture by John F. P. Lewis, of the above-named company, on "Improved Cast Iron, How to Get It in the Foundry," delivered before the British Foundrymen's Association (Scottish Branch), has been issued in pamphlet form. It contains much interesting information.

June Copper Production and Stocks

The Copper Producers' Association has issued its statement for the month of June as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States, June 1.....	165,995,932
Production of marketable copper in the United States from all domestic and foreign sources during June....	124,554,232
Deliveries of marketable copper during June:	
For domestic consumption.....	61,655,561
For export.....	71,460,519
Stock of marketable copper of all kinds on hand at all points in the United States, July 1.....	133,116,080
	157,434,164

This statement shows a decrease in stocks from June 1 to July 1 of 8,561,768 lb. The month's production was a decrease as compared with May of 2,408,312 lb. Deliveries for domestic consumption decreased 2,888,402 lb., while exports showed an increase of 9,481,962 lb.

The Empire Steel & Iron Company blew out its blast furnace at Oxford, N. J., July 10, for repairs. The furnace had been in blast a little over two years and had made the most successful run in its history, practically doubling the output of any previous period of the same length. This speaks well for the General Electric Company's turbine blower which was installed at this furnace about 16 months ago. The product of the furnace is basic pig iron, made from ores mined on the property of the company in the immediate vicinity of the furnace.

The Dowman-Dozier Mfg. Company, Atlanta, Ga., announces the removal of its estimating office to 1507-8 Candler Building.

Ductility in Rail Steel*

BY P. H. DUDLEY.

Owing to the exhaustion of the available low-phosphorus ores, Bessemer rail steel is now of necessity a high-phosphorus and low-carbon alloy, the mean carbon being about 0.50, manganese about 1.00, and silicon 0.10 to 0.20 per cent. (The chemical compositions refer in all cases to 100-lb. rails.) The impurity of phosphorus is limited to 0.10, while that of sulphur was limited formerly to 0.075 or 0.08 per cent. The manufacturers this year charged for this limitation of sulphur 5 cents extra per 100 lb. and it has been omitted from most specifications, though it is generally required that its content be reported.

Melts of open-hearth rails for the New York Central Lines contain from 10 to 24 ingots and make from 90 to 180 rails. Three butts are tested from different ingots of each melt; one is from the second ingot teemed, one from the middle of the melt and a third from the ingot before the last one poured. To pass the melt each butt must show a ductility of at least 5 per cent. in 2 consecutive in. upon the base or of 6 per cent. in 1 in., while in one butt the ductility of the steel is totally exhausted. The butts for this record are selected in rotation from the different ingots and the range for the melts is thus ascertained. The tests as a rule indicate that the ductility is quite uniform for each melt. The exceptions can usually be traced to colder rolling, differences in heating, and sometimes to brittleness of the metal itself.

The New York Central & Hudson River and the Boston & Albany Railroad companies have had a large experience concerning the requisite ductility of rails as girders to carry and distribute the wheel loads and also to resist flange abrasion upon curves under heavy traffic. Of the many thousand tons of Bessemer rails of 0.06 per cent. phosphorus and 0.60 to 0.65 per cent. carbon which the author commenced to roll in 1891 and continued until the exhaustion of the low-phosphorus ores in 1902, 90 per cent. were required to exceed a minimum ductility of 5 per cent. per inch as shown under the drop test, which in fabrication by the manufacturers was raised to 95 per cent. The maximum ductility was about 18 per cent., and the average was over 12 per cent. The minimum ductility was 4 per cent. per in. for acceptance of 10 per cent. of the rails, though confined by good mill practice to 5 per cent. of the output. The rails proved to be tough and but few fractures have occurred in service, while many are still in the tracks.

Six-inch, 100-lb. rails made in 1894, after sixteen years of service carrying 250,000,000 tons of traffic with a loss of less than 0.125 in. on the head, were tested early this year under the drop, base down on the supports. One butt gave 6 per cent. elongation before it sheared through the bolt holes and a butt from another heat gave 8 per cent. The metal in the head of either rail, like thousands of others in the track, did not flow to the sides but wore uniformly, owing to the efficient support of the metal of high elastic limit underneath the bearing surface. The resistance to flange abrasion was excellent, rails lasting six to ten years upon three and four-degree curves under heavy traffic. Rails of the same sections containing 0.10 per cent. phosphorus and 0.50 per cent. carbon used to replace them cut out upon the same curves in two or three years, although there has been some increase in the traffic.

Railroad Equipment Orders.—Orders for railroad equipment include the following: Great Northern, 20 Mikado locomotives; Illinois Central, 10 Mikado and 10 Pacific type locomotives, with specifications out for 2000 box cars; Atchison, Topeka & Santa Fe, 81 locomotives; Ann Arbor, 450 freight cars; Missouri Pacific, 50 Mikado locomotives and 50 passenger cars; Northern Pacific, 1000 steel underframes for box cars; Lehigh Valley, 25 steel baggage cars; Louisville & Nashville, 1000 steel frame underframes for box cars.

Corrigan, McKinney & Co.'s blast furnace at Josephine, Pa., has resumed operations after being shut down for several months for relining and some improvements.

*From a paper presented to the American Society for Testing Materials.

Mallet Articulated Locomotives on Ore Railroads

DULUTH, Minn., July 7, 1911.—The experience of two of the Minnesota iron ore railroads with the new Mallet articulated locomotives has been somewhat interesting. Both the Great Northern and the Duluth, Missabe & Northern have put such locomotives in service this year, the former for main line haul, the latter for the hill from its yards at Proctor down to the docks at Duluth. In the case of the former the attempt was made to handle 130 loaded cars over the main line, and the result was havoc for drawheads and all draft mechanism. The trains pulled to pieces, and there were occasionally as many as 1000 loaded cars out on the line under temporary repairs. The gross train loads that were being pulled amounted to a trifle more than 10,000 tons, and the revenue loads were more than 6000 gross tons. There is a state law in Minnesota that forbids the continuous labor of a train crew for more than sixteen hours, and this complicated the situation, as it was found generally impossible to make the run within that time from Kelly Lake yards, at the range end, and the docks. Train loads have now been cut down to 110 cars and the service is going better. Former loads, with locomotives that had been customarily used, were from 70 to 80 cars.

In the case of the Duluth, Missabe & Northern, there is a six-mile run from the Proctor yards to the docks on which the grade with traffic is 2 per cent. It was the plan of the company to operate these big engines on this hill, with especial reference to the haul of empties up to this yard, where main line trains for the mines are made up, and where they are broken, when coming down loaded. One locomotive had been able to pull but 27 cars up the hill, but the Mallets pull up 70 and with a trifling additional fuel cost. When the locomotives are running smoothly it is expected that there will be no greater coal consumption for 70 cars than there had been with 27. This road does not use these engines anywhere between the mines and Proctor. D. E. W.

New Publications

Quelques Mots sur L'Industrie Metallurgique Russe.—

(Some Words on the Russian Metallurgical Industry.) by Hippolyte Gliwitz, mining engineer, 5 Rue Otchakoffskaia, St. Petersburg. An abstract specially made for the Turin International Exposition from the author's larger work, "The Iron Industry of Russia." Paper. Fifty-two pages of text, 20 pages of descriptions of enterprises and 16 pages of maps, statistics, etc.

Among the various chapter headings of the work are the following: Deposits of iron ore; historical sketch; exploitation of iron ore and coke production; production of iron and steel castings; foreign trade of the Russian metallurgical works; iron consumption in Russia. The diagrammatic charts show the fluctuations from 1870 to 1909 in the Russian production and consumption of metallurgical products.

The Manila Times.—The second annual edition, being a supplement of the Manila Times, Manila, P. I., for March 19, 1911, has been received. This large, well-printed and beautifully illustrated publication would be well worth mention on account of the number, variety and interest of the articles therein if emanating from some of the long-established publishing houses of the United States, but coming as it does from so distant a part of the world, whence we are unaccustomed to expect such an elaborate special number, its size and contents are the more remarkable. The wonderful progress already achieved and the spirit of enterprise that has been awakened are set forth in an article on "The New Philippines." "The Progress of Scientific Research in the Philippines" deals with the practice of medicine and sanitary conditions and of the constant efforts toward improvement in the latter particular. "Education in the Philippines" shows by the variety of trade schools conducted that study is not merely along academic lines, but that the practical training of the Filipino youth is being attended to. Other articles are scarcely less interesting. The whole publication exudes the most confident optimism.

Lake Superior Mining News

Explorations in Canada

DULUTH, MINN., July 8, 1911.—There is some activity in exploration in the Canadian region to the north of Fort William and Port Arthur. To some extent this is due to the construction of the Grand Trunk Pacific Railroad, and some of the work is connected with that company. The expected construction of a connecting link for the Canadian Northern between Port Arthur and the eastern lines of the company is also responsible for some of this work. Canadian Northern interests have financed the construction of its Lake Superior division, which will connect its western and eastern lines and give it an all-rail through road to the Pacific. It is estimated that this link will cost about \$20,000,000, and work thereon is to begin the coming winter. It will run from the vicinity of Sudbury to Port Arthur.

Explorations in Minnesota

Some abatement is noticeable in Vermillion range explorations. The concrete shaft of the North American Iron Company, near Tower, is again full of water, which broke in about the point where the shaft is ledged. The pumps were drowned, and an attempt is now being made to unwater. The Camp shaft of the Vermillion & Mesaba Iron Company is now down 100 ft. and is still in ore, which has assumed much the character of that for which the nearby Chandler mine has been so famous in times past. This shaft has been in ore for something like 75 ft., and it begins to look very much as though a mine would result from this exploration. The same company's other shaft is about 100 ft. deep, in greenstone, and will be pushed to about 150 ft., where a drift will be run to ore that was cut by diamond drilling. The two shafts are 580 ft. apart.

A few of the numerous explorations that were under way some time ago and were then described in *The Iron Age* have ceased for the present; others are as active as ever. Those most active are the Vermillion & Mesaba, the Almar and several of the properties on and near Pine Island, north of Vermillion Lake. Drilling on a considerable scale is under way in the greenstone just east of the Ely group of mines and between them and Section 30 mine.

Some interesting exploration is under way on lot 12, section 6, 58-15, eastern Mesaba range. Three recent drillings are as follows:

	No. 1. Feet.	No. 2. Feet.	No. 3. Feet.
Surface	142	187	142
Ore	148	93	...
Ore and paint rock.....	5	...	...
Ore	15	...	...
Ore and paint rock.....	10	...	...
Ore and decomposed taconite.....	5	25	3
Ore	15	175	151
Ore and decomposed taconite.....	10	16	...
Ore	56	...	...
Ore and decomposed taconite.....	5	...	...
Ore	14	...	...
Decomposed taconite and ore.....	45	...	...
Same and ore seams.....	14	...	...
Taconite	93	...	...
Greenulite	42	...	...
Quartzite	11	...	...
Totals	635	...	...

Nos. 2 and 3 holes are not completed. The interesting facts of this drilling are as follows: That the formation at this point is very narrow, not exceeding half a mile in width, and these holes are about 1800 or 1900 ft. from the north line; that ore bearing formation in the only completed hole is 477 ft. thick, of which 248 ft. is merchantable ore, and that these tracts were extensively drilled in the past with the result of finding a small deposit of high grade ore, that was partially developed by very costly and difficult shafts, so difficult, in fact, that the property was abandoned by the operators then in charge. Now a very large body of ore is being found. From the depth at which ore has been found and its distance from the north line it will be seen that the dip of the formation at this point, instead of being about 8 deg., as is common to the Mesaba range as a whole, is more than 20 deg. The Longyear & Bennett interests, that control this lease, have a large tonnage of ore close by and will soon develop for mining on a large scale. For this purpose it will be necessary to divert the course of the outlet of Wine Lake, which is a large body of water, for a considerable distance, probably by a very large concreted conduit capable of carrying for the entire flow of a large river.

Cuyuna range explorations continue practically unchanged, with most of the work in the vicinity of the mines that have been opened to the south and southwest of Rabbit Lake. Shipments from the Kennedy mine go forward steadily, but not yet in large volume. M. A. Hanna & Co. are sinking a shaft at a point several miles southwest of all prior developments, where they have located a body of ore and from which they expect to make shipments next year. If no change is made in present plans there will be five shipping mines in that range next year.

On the Marquette Range

G. J. Maas and associates have organized a company to hold the lands they have been drilling in T 48-28, near the American mine, Marquette range. They are closing some leases with operating concerns for portions of these lands and expect the tracts to be opened very soon. A considerable tonnage of good ore, both hematite and magnetite, has been found by their explorations. It was on these lands that Mr. Maas sank the deepest diamond drill holes in the United States—3265 ft. This is quite a little deeper than the hole sunk by the Clergue interests some years ago at Republic.

Ore Shipments

Total shipments from the Cuyuna range have been 28,300 tons to July 1, and ore is now going forward at the rate of 500 tons per day, but this will now increase, as a steam shovel is at work at the Kennedy mine. Concrete shaft sinking, that has been in progress on that range for some time, has ceased for the present, and the Foundation Company has stored its material. Five of these shafts have been sunk, four of them for Rogers, Brown & Co. and one for the Inland Steel Company.

To July 1 the Duluth, Missabe & Northern Railroad has shipped but 2,050,000 tons of ore as compared with 5,097,000 tons for the corresponding period of last year, but the Great Northern has shipped 2,893,000 tons against 2,633,000 tons last year. Were it not for the Steel Corporation's contract with the Great Northern for the mining of the latter's lands the Great Northern would show a considerable falling off while the Missabe's loss would be very much less than it is. The famous Great Northern contract will have a marked tendency, for a number of years, to reduce net earnings of the Steel Corporation's two iron ore roads in this region.

Iron ore shipments from old ranges are increasing somewhat, though one mine that shipped as high as 3,000,000 tons in a season is now running at the rate of 30 or 40 cars a day. The Mahoning, which forwarded 1,500,000 tons in 1901, will output 1,000,000 tons this season. Its royalty rate on 1,000,000 tons is 15 cents, while on 1,500,000 tons it would pay but 12.5 cents. It is one of the Great Northern mines that is not included in the Steel Corporation leasehold.

Hearings before the Interstate Commerce Commission will soon begin at Superior, Wis., in which L. E. Lum of Duluth seeks to force the Great Northern Railroad to name an iron ore rate from the vicinity of Grand Rapids, Minn., to its docks on Lake Superior. Mr. Lum states in his complaint that he deems 40 cents a ton a reasonable and satisfactory rate. Grand Rapids is at the western end of the Mesaba range and is not less than 140 miles from the Great Northern's ore docks. No rate has ever been made from there as there has been no ore for transportation. Indeed, there is none now, and there are slight indications of any in the near future. The suit is, of course, an endeavor to secure a reduction of freight rates from all Mesaba range points. This is the first case of the sort to come before the commission, others having been before the Minnesota Railway and Warehouse Commission.

D. E. W.

The Massillon Bridge & Structural Company, Massillon, Ohio, has had plans prepared for the erection of a large new plant on the site formerly occupied by the local rolling mill of the Republic Iron & Steel Company, on which an option has been taken. The business of the company has outgrown the capacity of its present plant. A structural shop 135 x 600 ft. is proposed. The erection of the plant, it is stated, will depend on the disposal of \$100,000 in 7 per cent. preferred stock, for which the company expects to find a ready market. Elton Rice is president and general manager and Charles D. Yost secretary and treasurer.

The Sulphuric Acid Corrosion Test*

BY CLOYD M. CHAPMAN.

Materials are sometimes tested for a quality which in service they are not called upon to develop. The list of false or misleading tests which might be cited in this connection is a long one. Probably the most notable case of testing a material for a quality which is not required in service is that of subjecting cement to a tensile test.

Of the many examples of misleading tests there is one which, more than others, has come to the notice of Westinghouse, Church, Kerr & Co. Users of sheet iron and steel have been persuaded to believe that a metal which will best stand the sulphuric acid test as outlined in the Proceedings of the Society, Vol. VII, 1907, p. 231, is the one which will last longest under the usual conditions of weather exposure. With this belief in their minds they have purchased at greatly advanced prices metal which, while it would stand the sulphuric acid test admirably, was possibly no better suited to withstand the corrosive action of the particular exposure for which it was purchased than other metals purchasable at much lower prices.

This sulphuric acid test may be briefly described as follows: Samples of the metals to be tested are prepared by polishing their surfaces with fine emery, rubbing in a direction at right angles to the direction in which the metal was rolled. The size of the test piece recommended is 1-16 x 1/2 x 2 in. After careful weighing these small plates are immersed in a 20 per cent. solution of chemically pure sulphuric acid for one hour at a temperature of 15 deg. C. (59 deg. F.). They are then removed from the acid, washed, dried and again weighed. The loss in weight is taken as an indication of the ability of the metal to withstand corrosive influences.

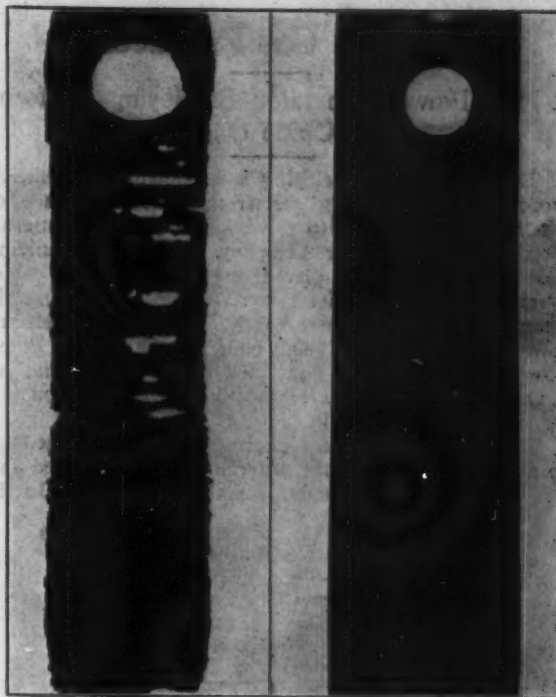
To demonstrate the differences between two methods of testing, namely, the weather exposure test and the sulphuric acid test, there are shown in Fig. 1 photographs of two plates, one of improved iron and one of common steel, showing results of weather exposure for 18 mo. The improved iron contained only minute quantities of impurities; the steel analyzed about 0.06 per cent. carbon, 0.095 per cent. phosphorus, and 0.38 per cent. manganese. These plates were clean and new when exposed side by side on the roof of the Maritime Building at the southern



Common Steel. Improved Iron.
Fig. 1.—Results of Exposure to the Weather for 18 Months.

extremity of New York City. They seemed to be rather free from mill scale, but any mill scale present was left on, as it usually would be in practice.

*Paper substantially in full, read before the American Society for Testing Materials, Atlantic City, June 28.



Common Steel. Improved Iron.
Fig. 2.—Results of a 12-Hour Acid Test.

They were exposed at an angle of 45 deg., facing south. This exposure is a rather severe one because of the fogs, smoke and the salt air from the bay, all of which are present in this locality. At the end of 18 months they were removed and their surfaces briskly brushed with a wire brush until the rust was removed and the surface of the metal brought to a polish. A careful examination of these plates fails to show any considerable difference in the corrosion and pitting which has taken place. As far as the eye can distinguish, each plate has rusted to the same extent. The depth and size of the pits formed by rust on the surfaces of these two plates are very nearly the same, but careful comparison shows slightly larger and deeper marks on the surface of the improved iron than on the surface of the common steel.

Having thus compared the ability of the two metals to withstand the action of the weather, a sulphuric acid test was made on parts of the same plates which had been exposed to the weather. Strips cut from the ends of these plates were prepared as above described, brought to about the same weight, and immersed in dilute sulphuric acid until one of them was nearly destroyed, while the other had lost only 7 per cent. in weight. At the end of the 1-hr. period prescribed by the test the improved iron had lost 0.83 per cent. while the common steel had lost 6.7 per cent. Fig. 2 shows the two specimens as they appeared after being subjected to the acid test for twelve hours.

It is quite unnecessary to point out that, although weather exposure caused approximately the same amount of rusting and pitting on the two plates, yet under the acid test one was attacked several times as violently as the other.

The makers of this improved iron claim that it is much more resistant to the corroding influences usually met with in service than are any of the ordinary grades of iron or steel, and they back up their claims by citing the sulphuric acid test as an indicator of the relative resistance of their metal to corrosion under service conditions.

We do not wish to be understood as claiming that the sulphuric acid test is useless or that when properly used it may not give useful information, but we do wish to call attention to its utter inability to give a reliable indication of the relative ability of metals to withstand the corrosive action of exposure to the weather.

The Republic Iron & Steel Company has moved the executive offices and the Eastern sales offices to a commodious suite of apartments on the sixteenth floor of the Whitehall Building, 17 Battery place, New York, overlooking the Hudson River.

An Oil Gas Producer

A New Power Generator Employing California Crude Oil

The problem of developing a satisfactory and efficient producer for generating gas from California crude oil has been a difficult one to solve, but recently the International-Amet Gas Power Company, 609 Central Building, Los Angeles, Cal., has placed on the market one which is said to be highly satisfactory. At the present time the company is installing three 400 hp. units in a gas electric power station which is being built for the Holton Power Company at El Centro, Cal. Fig. 1 shows front and end elevations of the producer while Fig. 2 is a section giving constructional details.

The installation is very interesting as the oil used has an asphalt base which has generally been considered capable of being burned under steam boilers only. In de-

fect control of the operator, although after an adjustment has been made it is possible to vary a load over a wide range without materially altering the thermal value of the gas. One of the especially advantageous features of this system is the possibility of starting it instantaneously from the cold plant. The minute the fire is lighted gas is generated, thus making it possible to operate the producer in large installations with a maximum economy by varying the number of units in service with changes in the load on the plant. It is claimed that while the efficiency of gas generation is lowered for approximately 15 min. after starting, this figure is only a small fraction of the maximum amount. Where the producer is operated in warm weather, or the fuel is artificially heated in cold weather to a temperature of 100 deg. F., it is stated that a producer can be put in full operation under full load in from 1½ to 2 min. which is the time required to start the auxiliary apparatus. It is claimed that one man may operate a plant having a capacity of 300 hp., while if special care has been taken in laying out the machinery

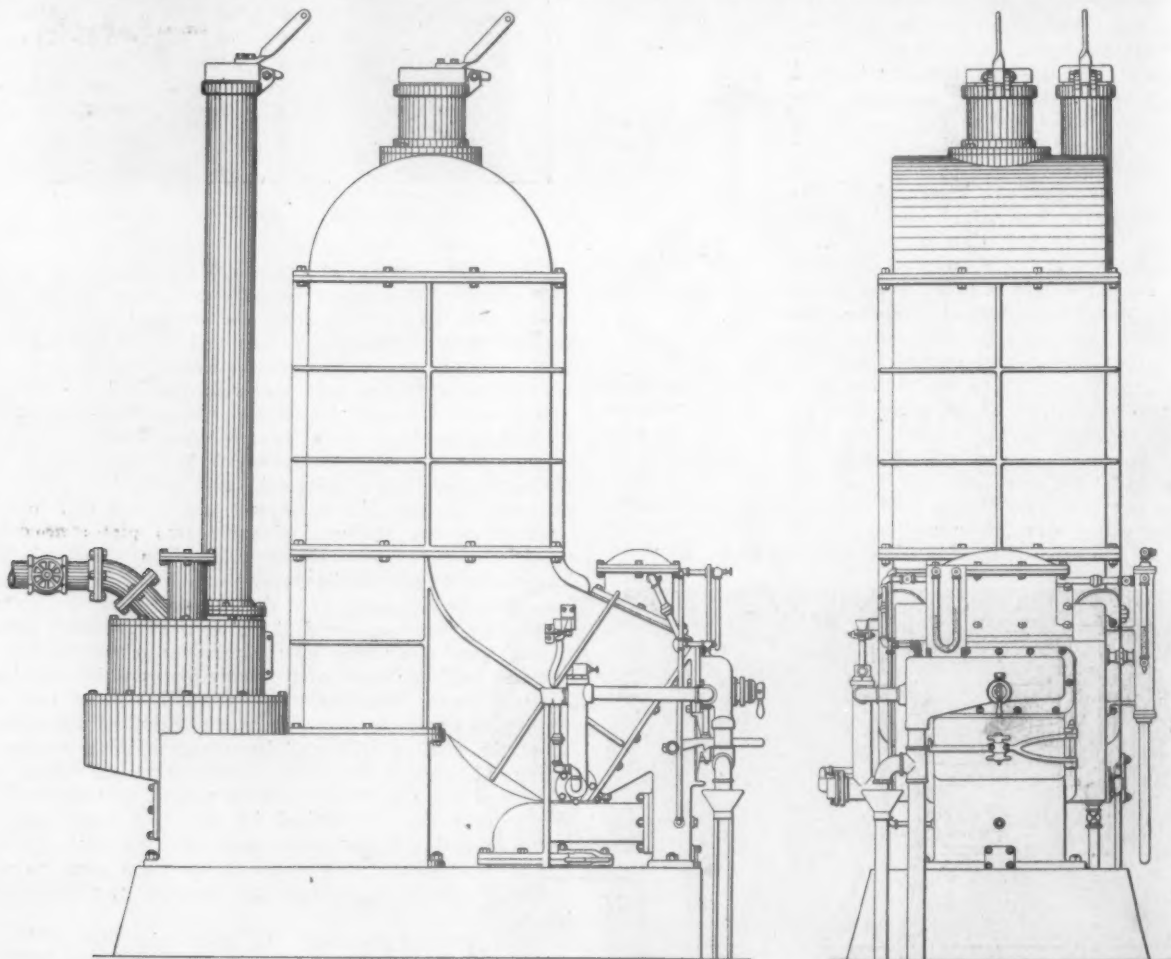


Fig. 1.—Front and End Elevations of a New Type of Oil Gas Producer, Built by the International-Amet Gas Power Company, Los Angeles, Cal.

signing this particular producer an effort was made to secure a permanent gas at a temperature which would not distill the asphalt base into a vapor which in turn would be carried to the engine cylinder and come down as solid carbon and score the walls. The system upon which the producer operates is known as the Amet-Ensign and generates a gas that is claimed to hold approximately 70 per cent. of its heat in fixed hydro-carbon compounds, the remainder being carbon monoxide and free hydrogen, the highest quantity of the latter being 12 per cent. by volume. The best thermal value of the gas is said to be between 200 and 250 B. t. u. cubic feet although it is possible to produce gases having a value ranging from 170 to 270 B. t. u. Difficulty was first experienced in keeping the thermal value of the gas constant under different load conditions, but this has been overcome by maintaining the oil automatically at a fixed temperature to insure constant viscosity and regulating the quantity of oil forced into the producer so as to secure the proper relation between it and the quantity of air. The proportions of oil and air in the mixture are adjustable and are under per-

a 500-hp. plant can be operated with the same help. The amount of attention required is the same as that which should be given to oil-fired boilers of the same capacity or about 3 min. every half hour.

Details of the Producer

Referring to Fig. 2 which shows some of the constructional details of the producer, the oil fuel is fed in from a weir-box, provided with an adjustable needle valve. Oil runs down the adjacent inclined slide or plate while the air comes up from below and passes under the lower edge. It has been found in operation that only the oil containing a high percentage of asphaltum reaches the lower edge of the plate and by burning there maintains the heat required to gasify the lighter constituents of the oil. At this point the products of combustion and distillation pass up through the brick lined combining tube at the right and pass down to the first water seal. In the newer types of producers it is expected that steam will be used which will be supplied by a small boiler. This steam which experiments have shown to be beneficial in its effects

will be furnished at practically atmospheric pressure and will maintain a slightly lower temperature immediately above the slide although this is not absolutely necessary. To maintain the relative amounts of oil and air constant with the production of various quantities of gas the difference of pressure on two sides of an orifice through which the air passes is applied to the oil in the weir-box. This automatic control of the relative proportions of oil and the air has proved to be one of the vital features of the gas making process and in operation it is very remarkable in the uniformity of the gas which it maintains under varying requirements. The gas after passing through the first water seal enters a rotary washer which is shown at the base at the left of Fig. 2. At the top of the producer proper and on a stand-pipe connected to the gas main beyond the washer are burn-out valves which are used in starting up, ordinarily, although in the case of a smaller producer it is sometimes necessary to open this valve at intervals to clear the combining tube of a soft deposit of carbon. This operation requires but a

Other Installations

Among the first commercial units installed was one for the United States Reclamation Service at Yuma, Ariz., which supplies gas for two 50-hp. engines operating a scoop wheel for raising water from the Colorado River. This producer was not of course as perfect as those now being built, but it was reported to have given highly economical and reliable operation. The guaranteed oil consumption for this plant was 1 gal. per $6\frac{1}{2}$ b. hp. and in actual operation this has been considerably exceeded. It is stated that no interruption of service due to any fault of the producer has been experienced and the engine cylinders are still in excellent condition. In another installation at Avondale, Ariz., a 200-hp. producer plant developed 10 b. hp. per gallon of oil at a 75 per cent. load.

El Centro, the site of the Holton Power Company's plant, is in the heart of the richest agricultural section of the world, namely, the Imperial Valley, and is located about 50 ft. below sea level. With the completion of the great irrigation project for this section numerous small communities have sprung up, and towns have been established. For supplying these with light and power the Holton Power Company has constructed a hydraulic plant at Holtville and a steam auxiliary plant at El Centro. The gas producer-gas engine plant is an addition to the latter and will take care of the rapidly growing service. The installation which will be housed in addition to the present buildings consists of three 400 hp. producers supplying a 1000-hp. twin tandem gas engine directly connected to a three-phase 60-cycle, 2400-volt alternator, operating at a speed of 150 r.p.m. A 15-ft. fly wheel weighing approximately 40,000 lb. provides very close electrical regulation, and it is expected that it will be possible to operate the gas-engine unit in parallel with the hydro-electric and the steam plants. The main oil supply for the producers will be stored in a concrete tank which will supply auxiliary tanks provided with pumps for forcing the oil to the producers.

All the water required for this installation will be for the gas washer, the oil chamber and the engine cylinder water jackets. Although the amount required for the last will be comparatively large, the supply will be used continuously, so that practically the only loss will be by evaporation from the cooling tower.

Producers of this type make a small amount of lamp-black as a by-product, but as the El Centro plant already includes an illuminating gas plant making this substance as a by-product, but not in sufficient quantities to furnish the steam required when burned under a boiler in connection with the illuminating gas process, the lamp-black made by the producer will be delivered to the settling tank of the other gas plant. This plant, however, is not the customary arrangement, as ordinarily a small settling tank located close to the producer is employed, and the wash water is used over and over again and a small amount of lamp-black skimmed from the top.

The Sauer Power Generating Company, 5115 Rosetta street, Pittsburgh, manufacturer of Sauer patented shaft bearings, small steam turbines, gas burners and other specialties, finds its list of possible customers so large that it feels justified in increasing its capacity. It had several manufacturing sites under consideration and will likely close soon for one of them. This is in a growing part of Pennsylvania, with good railroad and interurban connections, close enough to Pittsburgh to secure raw materials and low freight rates. A small foundry for gray iron castings and possibly one for brass work are being considered in connection with the new location, and some machine tools, in addition to those now used, will be purchased at a later date.

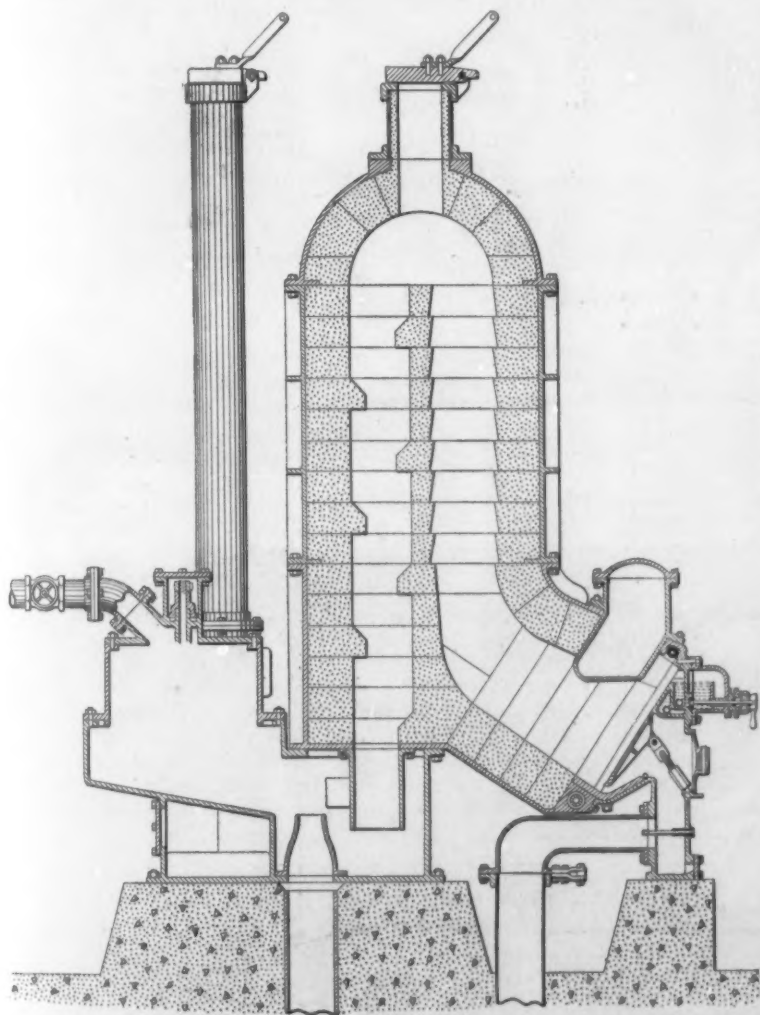


Fig. 2.—Sectional Elevation of a 300-H.P. Producer.

moment and while it is being performed the oil is shut off. It is stated that after a producer has become thoroughly warmed up and is running regularly this valve need not be opened except at intervals of several hours. The temperature, pressure and various other conditions occurring in a producer are indicated by various gauges of the customary type.

As the flow of oil through the needle orifice and over the weir depends both on the pressure and the viscosity, it is desirable to maintain the oil supply at a reasonably constant temperature. To do this a water-jacketed chamber is placed in the oil supply line and the circulation of the water is controlled by a thermostat immersed in the oil. In rating these producers, 1 hp. means that the producer has sufficient capacity to generate gas having a heat value of 10,000 B. t. u. per hour as shown by chemical analysis and checked by a calorimeter.

The Gary Sheet-Bar Mill

An 18-Inch Continuous Mill Built by the Indiana Steel Company

At the time plans were being prepared by the Indiana Steel Company (subsidiary of the United States Steel Corporation) for the 24-in. billet mill at Gary, Ind., the layout of the sheet-bar mill was also considered. Completion of the sheet mills of the American Sheet & Tin Plate Company at Gary has already made obvious the immediate occasion for this new sheet-bar capacity. This early need of the mill was so far from being anticipated at the time of the erection of the billet mill building that no provision was made then for the entrance into the sheet-bar mill. The making of this 100-ft. opening was required to be done without interrupting the operation of the billet mill. This span is now carried on a single truss, the vertical members of which are the former building columns. After the balance of the truss was built and riveted in place, so

ning on to the 24-in. billet mill transfer table. An ingot of this size will weigh approximately 8500 lb. Where the ingot is rolled down to a smaller sized bloom, it will have to be cut to a length not greater than 90 ft., which is the length of the transfer table carrying the bloom from the 24-in. mill feed table to the sheet-bar mill feed table. The product of the sheet-bar mill will be bars varying from 8 in. x $\frac{3}{4}$ in. up to 8 in. x $1\frac{1}{2}$ in., this latter size being the limit of capacity provided by the steam flying shear.

The course of the bloom through the sheet-bar mill is briefly as follows: Brought from the 24-in. billet mill run-out table by the above-mentioned transfer, Fig. 2, to the sheet-bar mill feed table, it is carried to the gear-driven flying crop shear. From this shear the bloom passes directly into the mill proper, which is an eight-stand 18-in.

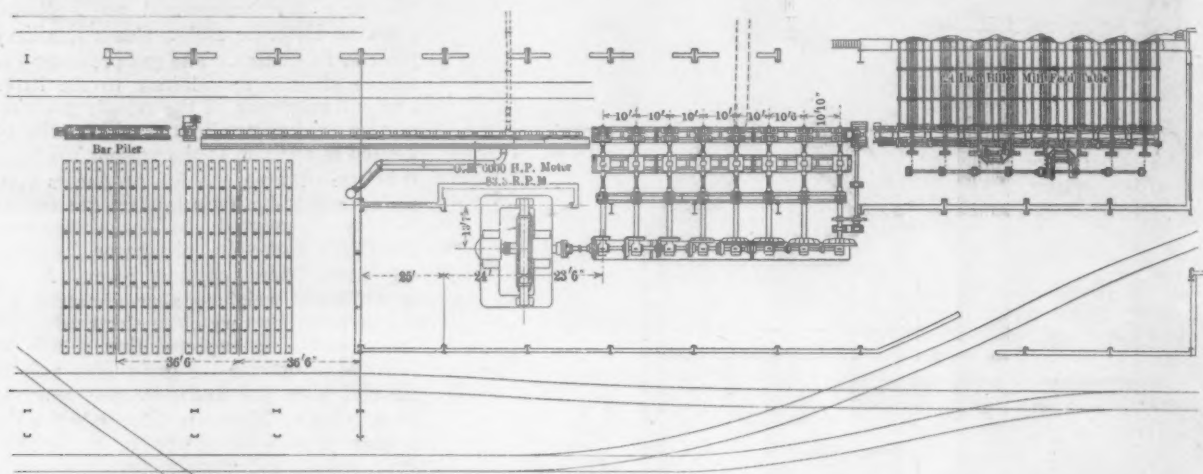


Fig. 1.—Lay-out of the Gary 18-inch Continuous Sheet-Bar Mill, showing Its Relation to the 24-inch Billet Mill.

that the load could be carried on it, the building columns were cut out below the bottom chord of the truss. The 24-in. billet mill was described in *The Iron Age* of October 21, 1909.

The relative location of the sheet-bar mill to the 24-in. billet mill is shown in Fig. 1. Steel for the sheet-bar mill is to be supplied in the form of a bloom, 44x7 $\frac{1}{2}$ in., which bloom may be an entire ingot rolled in one length after being cropped off by the horizontal shears previous to run-

continuous mill, the first six stands of which are arranged for rolling the billets in closed passes, the last two in plain rollers. From the mill the billet runs through the steam flying shear, Fig. 3, where the bloom is cut into lengths of 30 ft. These pieces slide over a friction roller table to a set of pinch rollers, Fig. 4, which deliver the pieces to the bar piler beyond. Alongside of this bar piler is a 3 x 30 ft. Fairbanks scale, on which bars may be weighed in transit from the bar piler to the cooling beds alongside.



Fig. 2.—View of the Gary Sheet-Bar Mill, Showing a Portion of the Transfer Table from the Billet Mill and the Mill Feed Table.



Fig. 3.—View of the Gary Sheet-Bar Mill, Showing the Steam Flying Shear.

Immediately south of these cooling beds is the loading track. A 20-ton Alliance Machine Company crane having a special cradle, also shown in Fig. 4, spans this end of the building and handles the material from the bar piler to the cooling beds and from there to the cars in the loading track.

The transfer table at the head of the mill is of simple

rail type construction, with ordinary chains and dog, and was built by the American Bridge Company at the Pencoyd Works. This table is approximately 90 ft. long over all and spans a distance of 57 ft. 4 in. between the center lines of the billet mill feed table and the sheet mill approach table. This transfer table is not provided with skids, the chains and drive being arranged so that they



Fig. 4.—View Showing the Pinch Rolls at the End of the Shear Runout Table, Crane and Special Bar Cradle, and Cooling Beds. The Bar Piler as Here Shown is Incomplete.

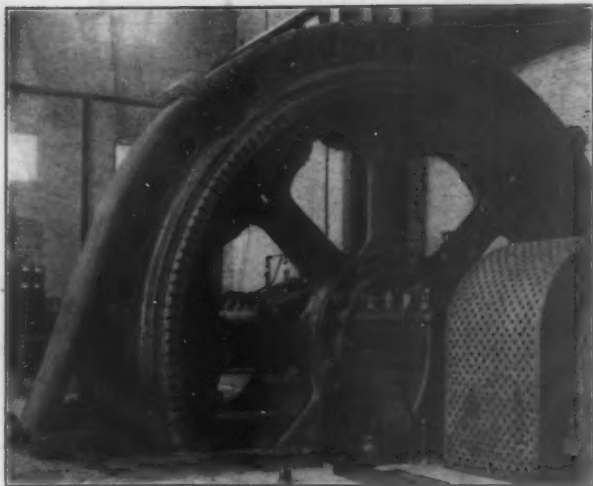


Fig. 5.—The General Electric 6,000 H.P. Main Drive Motor for the Sheet-Bar Mill.

can be reversed. This approach or mill feed table, with the exception of its structural work, which was furnished by the North Works of the Illinois Steel Company, was also built by the American Bridge Company. It is similar in design, but the opposite hand, to the approach table installed in the 18-in. billet mill and was designed with the idea of using as many parts as possible which were duplicate with that table. The crop shear is driven by means of gearing from the spindle driving the first pair of mill rolls. This crop shear is intended to operate only on billets where crop ends are to be removed or for the saving of the undamaged portions of a bloom "cobbled" in the mill. This shear was designed and built by the Morgan Construction Company, which company also built the remainder of the mill.

The sheet-bar mill is of the standard Morgan Construction Company type, except that after each stand beyond the third there are provided what are known as looping tables which are arranged with apron plates that may be raised and lowered by hydraulic control, each apron plate being operated independently from its own cylinder. As ordinarily provided in a continuous mill, it is necessary that each succeeding roll shall operate at a speed directly proportional to the reduction in that pass and also with proper relation to the speed at which the bloom is being delivered from

of the following stand is not quite as rapid as the delivery speed of the preceding stand. By means of this arrangement the buckling downward and sideward of the bloom is prevented.

The distance from the gear-driven flying crop shear to the first stand of rolls in the mill is 5 ft.; between stand No. 1 and stand No. 2, 10 ft. 10 in.; between stand No. 2 and stand No. 3, 10 ft. 6 in.; and between the stands in the remainder of the mill, 10 ft. The housing shoes and pinion shoes of the mill are bolted together in continuous form in the direction of the mill. Each stand is arranged so that it can be removed entire and another stand substituted when roll changes are desired. The speeds of the mill passes, based on 18 in. pitch diameter of the rolls and 83.3 revolutions of the driving motor, are, for the first stand, 78.5 ft. per min., and for the eighth stand 626 ft. per min. The intermediate stands increase the speed of passing between these two in accordance with the gear ratio of the drive.

The mill is driven from a 6000 h. p. fly-wheel rotor type General Electric induction motor, Fig. 5, a duplicate of the motor driving the 18-in. continuous billet mill. This motor operates at a normal speed of 83.3 r.p.m. and drives through a bevel gear train shown in Fig. 6.

From the last stand of the mill the bloom is delivered to an Edwards steam flying shear. The design of this shear has long been familiar and the method of obtaining quick cutting action by the exhaustion of steam from one side of the operating piston is well known. The run-out table from the steam flying shear is about 84 ft. long and carries the bar to a set of motor-driven pinch rollers. These rollers seize the bar and deliver it on the bar piler. The pinch rollers are driven by a variable speed motor, which permits accommodating the speed of the rolls to the speed at which the bar is delivered from the flying shear. The first bar running on the bar piler from the pinch roller drops down a sufficient distance below the center, so that bars may accumulate to the height of 30 in. before requiring to be lifted off to the cooling bed. The bar piler consists essentially of blocks with intervening spaces, the bars resting on the blocks and permitting crane hooks to enter below them. At the end of the bar piler is a disappearing stop, or collapsible bumper, which is designed to be dropped down so that a bloom can pass completely over the bar piler in the event of not having been sheared to short lengths in passing through the flying shear. Directly opposite the bar piler is cooling bed No. 2. This

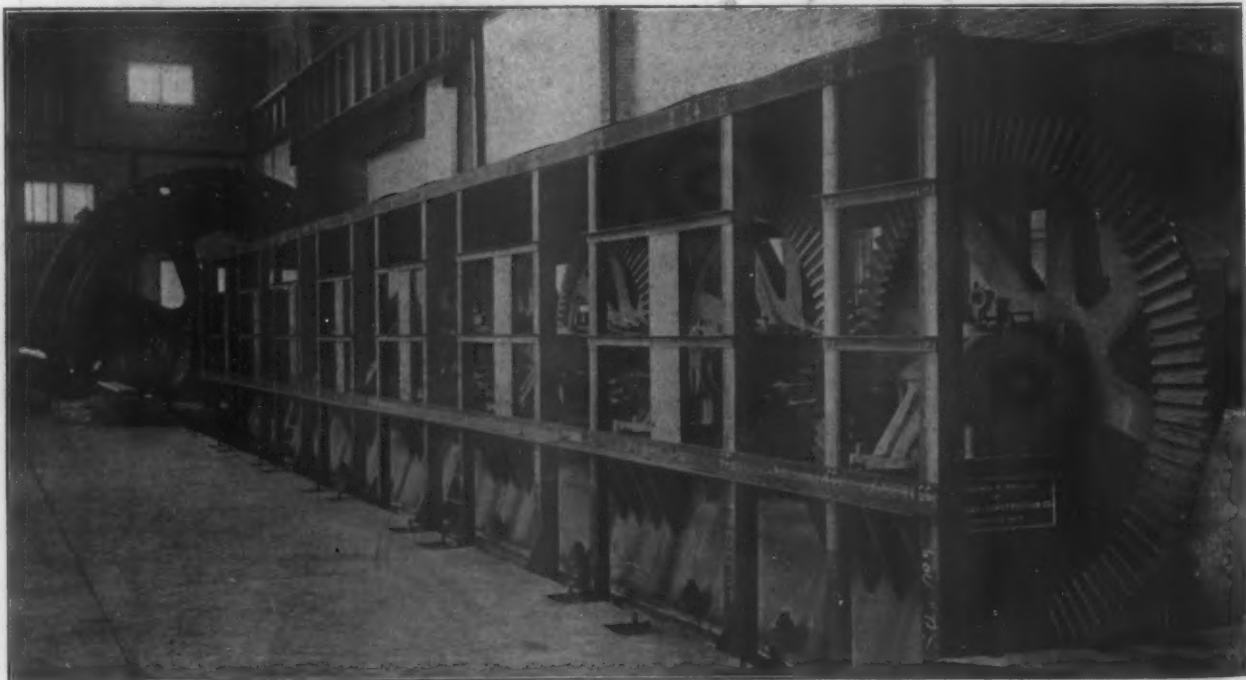


Fig. 6.—Driving Motor and Bevel Gear Drive for the Gary Sheet-Bar Mill.

the preceding roll. This necessitates a certain fine and intimately related adjustment of the consecutive stands. The function of the apron plates in this instance is to raise up and take up the slack in the bloom if the speed

consists of fire-brick piers covered with cast-iron coping plates having ridges in the top to allow circulation of air around the piles of sheet bar. The capacity of the sheet-bar mill is about 50,000 tons a month.

A Garvin Plain Milling Machine

The plain milling machine shown in the illustrations, known by its builder, the Garvin Machine Company, Spring and Varick streets, New York, as the No. 22, is

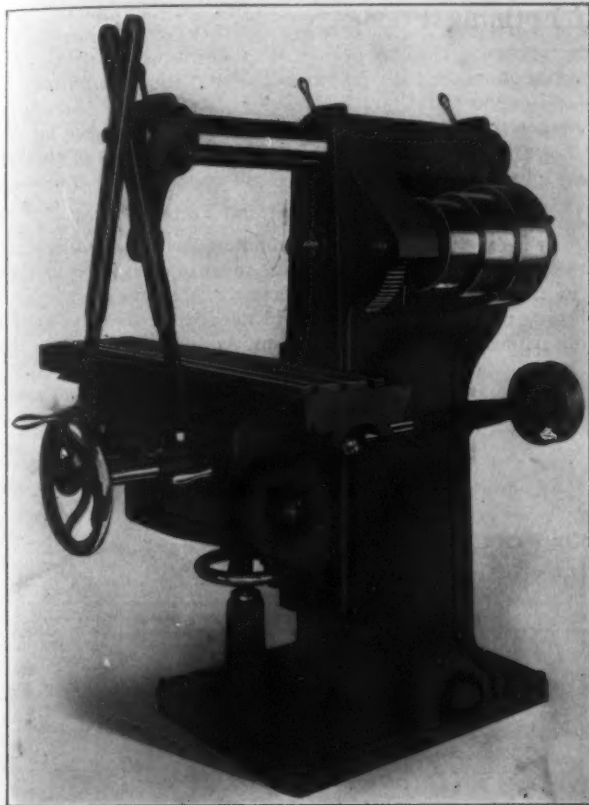


Fig. 1.—The Garvin No. 22 Plain Milling Machine.

designed primarily for manufacturing, to meet the purposes of those who want a powerful machine of large capacity with parts reduced to the plain essentials and capable of continuous hard work. In Fig. 1 will be seen the new feature that one side of the machine is closed, joining the arm and spindle bearings rigidly together and to the body of the machine, the idea being to secure the utmost solidity and freedom from vibration. The feed is driven from the spindle or the back shaft, the change being accomplished by the throwing of an eccentric, seen in Fig. 2. A range from $1/200$ in. to $1/4$ in. per revolution of spindle is obtained. The changes are easily made through change gears and the drive is by a wide belt with a tightener.

The large oil grooved table is driven by a non-rotating screw and steel nut, as in Fig. 3, both screw and nut being hardened. The hand feed is through a large hand wheel and spiral gears running in oil. The rotary feed nut is driven direct by a hardened steel worm gear and worm running in oil. The feed box is built into the saddle so that the stresses are taken directly with a minimum number of joints. The massive saddle has micrometer adjustment in and out. The knee has a Garvin closed top construction and is raised by micrometer hand wheel and screw which does not pass through the floor. The arm is

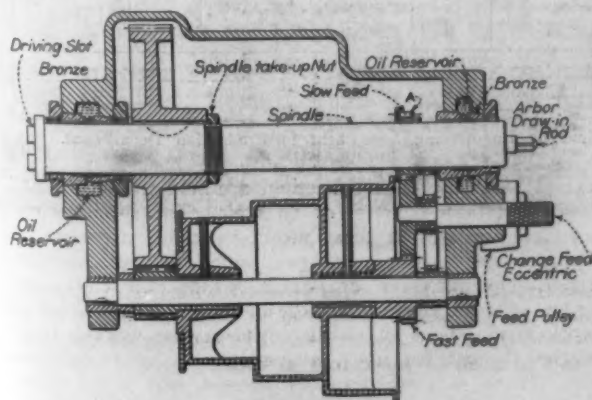


Fig. 2.—The Feed Changing Mechanism.

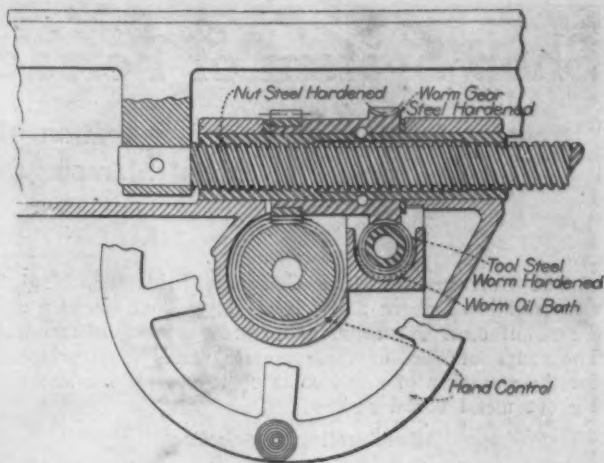
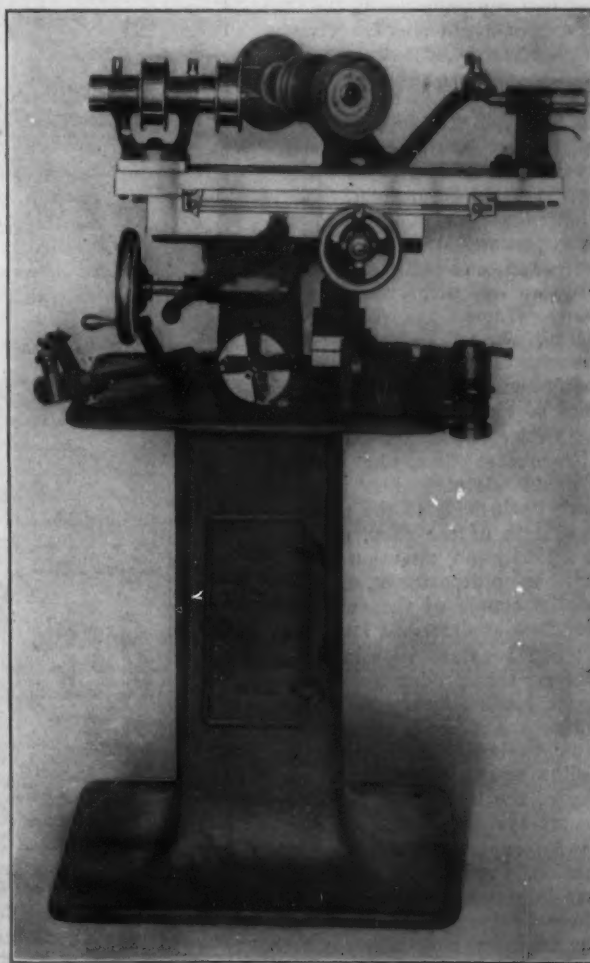


Fig. 3.—The Details of the Table Drive.

exceptionally large and is connected by braces to the saddle, leaving the yoke free to adjust itself to suit the arbor and the position of the cutter. All gears are protected. The machine weighs 3050 lb.

Improved Tool and Cutter Grinder

The Miami Valley Machine Tool Company, Dayton, Ohio, has brought out improved models of its No. 1 universal tool and cutter grinder and the plain cutter and reamer grinder. The chief feature of change is the



An Improved Tool and Center Grinder, Built by the Miami Valley Machine Tool Company, Dayton, Ohio.

square pedestal with a tool shelf, as seen in the illustration. This affords convenient space for the laying of work and tools, while the cupboard has ample room for storing all attachments, which at the same time gives additional weight.

The Holophane Company announces that the address of its New York office, including all of its departments, was changed to 16 East Fortieth street July 10.

Shop System of Ferracute Machine Company

Details of Administration and Operation of the Works at Bridgeton, N. J., for Making Metal Stamping and Forming Presses

BY HUGO DIEMER*

The Ferracute Machine Company, Bridgeton, N. J., was established about 1863. It employs about 200 men in the manufacture of machinery for press working of metals. The range of sizes of these presses varies from presses for the stamping of small coins up to presses for stamping out metal burial caskets.

Administrative Organization

The organization of the company is as follows:

The president acts as administrative and general supervisory officer. This office does not carry on any routine work.

The secretary and treasurer has charge of the accounting department and also the selling department.

The engineering department creates the designs but does not have any direct official connection with the shop except through the medium of the production department.

The superintendent and assistant superintendent, according to the official organization chart of the company (which is posted in various places in the offices and shops) are responsible for the direction of the manufacturing departments through the production department. This department has charge of the transforming of all orders received from the sales or the engineering departments into shop orders, as well as the scheduling and routing of work, instruction cards to employees, bonus wage system, stores, time and cost records.

Under conditions existing at the present time, the superintendent devotes his personal time exclusively to the technical operation of the shop, devoting practically no attention to the production department, excepting in the course of the daily conferences as described later.

The assistant superintendent makes the production department his headquarters, but devotes the greater part of his time to being in the shop and following out the practical working of the instruction cards and bonus system.

An expert in factory organization, Frederic A. Parkhurst, has been with the company for three or four years as organizing engineer, and lately has been acting in the additional capacity of special works manager. These duties are ultimately to be assumed by the vice-president.

Order System

Customers' orders are transcribed in the accounting department on a general order form, which is made out in triplicate, one copy remaining on file in the accounting room, one copy going to the engineering room, and one

copy going to the production department. So far as the shop is concerned, the general order stops when it reaches the production department.

Production Department and Factory Board

It is the function of the production department to analyze the general orders and to reissue them in such form as they see fit. The engineering department prepares all the necessary technical data which are needed by the production department in order properly to reissue the order to the shop.

There are "factory board meetings" held every morning

MATERIAL LIST

FERRACUTE MACHINE CO.

DATE April 18 1911

MATERIAL REQUIRED FOR Press D.A. 4.3

FOR The Simms Magnet Co.

QUANTITY	NAME OF ARTICLE	MATERIAL	PIECE SYMBOL	DRAWING	SKETCH	REMARKS
1	Bolster	I.C.	B1DA3a	5771		
4	Bolster clamp	S.C.	B2-2a		3885	
4	" " bolt	W.I.	B3-2a 86	5773		
4	" " nut	S.C.	B4-2a		3891	
2	Lower die bolt	W.I.	B5a 85	5773		
1	Bolster bushing	I.C.	B6DA3a	5772		
1	" " blocking ring	"	B7DA3a	"		
1	Right front bolster block	Mch.S.	B8DA3a 10	5773		
1	Left back " "	"	B8DA3a 11	"		
1	Left front " "	"	B9DA3a 12	"		
1	Right back " "	"	B9DA3a 13	"		
4	Bolster block screw	W.I.	B10DA3a 56	"		
4	" " bolt	Mch.S.	B11DA3a 9	"		
1	Clutch slide	CHROME NICKEL STEEL	CP1-9b 3	10392		
1	Beam	BEST CR. C. STEEL	CP2-9b		5028	
1	" " pusher	C.S. LOW GRADE	CP3-9b		3988	
1	" " spring	BRASS	CP4-9b 24	10392		
1	" " glands	I.C.	CP5-8b 17	"		
1	Lock	M.I.	CP6-9b 8	"		
1	Clutch slide bushing	ALUM. BR.	CP7-9a		3786	
1	Clutch lever	S.C.	CP8-9b		3586	
1	" " stud	W.I.	CP9-9a 12	10392		
1	Lever spring	BRASS	CP10-9a 23	"		
1	" " hook	W.I.	CP11a 15	"		
1	" " bolt	"	CP12-9a 22	"		
1	Upper brake	I.C.	CP13-9a		3639	
1	Lower " "	"	CP14-9a		3646	
1	Upper brake leather	LEATHER	CP15-9a 29	10392		
1	Lower " "	"	CP16-9a 28	"		
12	Brake dowels	WOOD	CP17a 32	"		
1	" " bolt	W.I.	CP18-9a 14	"		
1	" " spring	BRASS	CP19-9a 25	"		
1	" " stud	W.I.	CP20-9a		4095	
1	" " stud washer	"	CP21-9a 27	10392		
1	" " adj. screw	"	CP22-9a		5054	

LISTED A.M.B. CHECKED _____ APPROVED _____ ORDER 270420

5 SHEETS. SHEET 1

Fig. 1.—Material List Sent by Engineering Department to Production Department.

except Saturday. These meetings are held at 8 o'clock and last about three-quarters of an hour. The special works manager presides at these meetings, which are attended also by the assistant manager, superintendent, assistant superintendent, chief draftsman, production clerk, and order of work clerk. At these meetings the condition of work in the shops is considered, also what work is to be started through for stock, what shipments are to be made, etc. There is a stenographer present who takes short-

*Professor of Industrial Engineering, Pennsylvania State College, and consulting industrial engineer.

hand notes. Within half an hour after the meeting each one present is handed a typewritten copy of the minutes. These minutes contain the daily repair order list, also all shipments promised for the day, also a statement of large jobs which are being operated on the bonus wage system, showing the time started as well as the total time put in to date. A definite date of completion is written down for every order. This date is established as the result of the daily conferences. All parts for repair orders are built on the order number covering the repair order.

Shop Orders

All machines are built on a separate job series designated as merchandise or M jobs. All work for plant is made on "Plant" or P jobs, which include special machinery as well as small tools. All work for factory such as furniture, fixtures and building repairs is built on F jobs. Items incidental to shop expenses such as light, heat, janitor services, etc., are charged on S jobs, the S jobs being subdivided into 55 numbers which are closed monthly. These are also departmentalized monthly. Repair of small, rapidly wearing tools is included in this series.

All expenses incidental to business is charged to B

STORES CARD				Form F. A. P. 7-0		FERRACUTE MACHINE CO.		
OBJECT				Order in Lots				
<i>Plant</i> <i>with Clamps, studs & nuts & Bolts</i> <i>Finished as per drawing 6042</i>				Danger Limit				
Number or Size		Section	Unit	Remarks		Minimum		
<i>61</i>		<i>Spun</i>	<i>Piece</i>					
Date	Quantity Ordered	Order No., Job No., or Purchase	Quantity Received	Quantity Delivered	Quantity Balance	Price	Amount	Cash Balance
<i>1/20</i>	<i>5</i>	<i>2531</i>						
<i>1/20</i>	<i>5</i>	<i>2531</i>	<i>5</i>				<i>92.41</i>	<i>92.41</i>
<i>1/20</i>	<i>5</i>	<i>2527</i>		<i>5</i>	<i>0</i>	<i>18.48</i>	<i>92.41</i>	<i>00</i>
<i>1/20</i>	<i>6</i>	<i>2558</i>						
<i>1/30</i>		<i>21258</i>	<i>6</i>		<i>6</i>	<i>12.97</i>	<i>79.18</i>	<i>79.18</i>
<i>1/30</i>	<i>6</i>	<i>21431</i>		<i>6</i>	<i>0</i>		<i>79.18</i>	<i>00</i>
<i>1/30</i>	<i>6</i>	<i>25300</i>						
<i>1/30</i>		<i>25300</i>	<i>6</i>		<i>6</i>	<i>8.75</i>	<i>58.48</i>	<i>58.48</i>
<i>1/30</i>		<i>25395</i>		<i>1</i>	<i>5</i>		<i>9.74</i>	<i>48.74</i>
<i>1/30</i>		<i>25395</i>		<i>5</i>	<i>0</i>		<i>48.74</i>	<i>00</i>
<i>1/30</i>	<i>6</i>	<i>25488</i>						
<i>1/30</i>		<i>25488</i>	<i>6</i>		<i>6</i>	<i>6.513</i>	<i>39.08</i>	<i>39.08</i>
<i>1/30</i>		<i>25488</i>		<i>6</i>	<i>0</i>		<i>39.08</i>	<i>00</i>
<i>1/30</i>	<i>6</i>	<i>25488</i>						

Fig. 2.—Stores Ledger Card.

jobs, which include administrative salaries, taxes, advertising, legal expenses, etc.

All work built for stock is charged to L jobs, L designating lot. The only manufactured goods are those included in the L type of jobs. The parts made on L jobs are the only ones which are carried on a perpetual inventory.

Material List

The engineering department writes out a material list for each general order as per Fig. 1. The present drawing room practice is to draw but one piece on a sheet with as many views as are necessary to depict the piece. The complete dimensions are shown or can be obtained by scale only on the pattern shop copy. The machine shop copy of the drawing shows dimensions only where these are needed with the machine shop in order to do their machine work properly. When the material list is received in the production department it is first checked against the stores' ledger cards in order to see how much of their material is in stock or should be made on stock orders.

The store ledger cards carry a money value for each item as well as the total money equivalent of the balance on hand at any time; that is, the balance in stock is expressed in dollars and cents at the time of making each entry. See Fig. 2. A monthly record is kept of all debits and credits to stores. This record is combined with the value of the stores on hand at the beginning of the month as a check on the value of the stores on hand at the end of the current month. The stores' ledger has between 6000

and 7000 entries in it. The money value of the manufactured parts is altered from time to time as the cost of production changes.

A general survey of the cards shows a uniform reduc-

NEXT WORK		FORM F. A. P. 7-0b		FERRACUTE MACH. CO.	
MACHINE	DEPARTMENT	WORK NUMBER			
QUANTITY OF PIECES	DESCRIPTION			SYMBOL OF OPERATION	
BONUS CHART					
MOVE TO			INSTRUCTION CARD NO.		
ORDER	DATE WANTED				
DRAWING	SHEET	MONTH	DAY	YEAR	SIGNED

Fig. 3.—Work Number Card for Routing Clerk.

tion of costs since the introduction of the present production and bonus wage system.

Since the introduction of the production department, it has been possible to fill orders far more promptly than previously. An important matter disclosed after the production department was in running order was the fact that the foundries that were supplying castings were furnishing with promptness only the larger and more desirable parts and holding back on the smaller and more difficult pieces, in this way, holding up the company's delivery of shipments.

Castings and manufacturing materials and supplies are all requisitioned from the production department.

Organization of Production Department

The production department is divided into two sections; one section designated as the controlling side. The assistant superintendent is located in the production office. He acts in the capacity of shop engineer and has control of the planning of the shop operations, time studies, instruction cards and bonus system. The controlling side of the production department employs beside the shop engineer, an order of work clerk, a chief routing clerk with one boy as assistant, one time boy, one factory mail boy and one schedule clerk.

The statistical side of the production department is presided over by the production clerk and includes also a stores' clerk, two cost clerks, the time-keeper and the shipping and receiving clerk.

The bill of material, when received from the engineering department, is turned over to the chief routing clerk. The chief routing clerk subdivides the general orders into "jobs" and subdivides these "jobs" into "work numbers." He also lists all operations, using letter symbols to design-

Chart 208, Feb. 6, 1911.

P4 Shafts—CE, FA, TN and TH complete, ready to 6R from rough turned forging of .50 car steel drawing, 6L.		
Time each.	Bonus each.	
3.35 hours.....	.076	
3.25 hours.....	.086	
3.15 hours.....	.096	
3.05 hours.....	.106	
2.95 hours.....	.116	
2.85 hours.....	.126	
2.75 hours.....	.136	
2.65 hours.....	.146	
2.55 hours.....	.156	
2.45 hours.....	.166	
2.35 hours.....	.176	
2.25 hours.....	.186	
2.15 hours.....	.196	
2.05 hours.....	.206	

Fig. 4.—Bonus Chart Given Workman with his Work Card, Showing Amount of Bonus to be Paid for Time Reductions.

nate each operation. He also designates which machine is to do each operation. He indicates bench work where such is required. He indicates the "Work Numbers" to which the men in the shop must charge their time when doing the work. The boy assistant makes out the "Work Number" cards in triplicate from the routing clerk's sheet, (see Fig. 3). One copy of each of these work cards goes to a rack in the shop, one copy to a rack in the production

office which contains pockets arranged by numbers of machines, and one copy goes into a file in the production department office, in which the work cards are arranged by order numbers.

The chart that is made out by the routing clerk also serves as a cost sheet and is called a "Schedule Cost Sheet."

After the work cards have been issued from the

In making time entries on the schedule cost sheet, green ink is used for over-time, and yellow ink for the monthly inventory summary. Material and sundries used on each order are also posted on this same cost sheet in columns provided for them.

When the time cards go into the production office from the gang bosses, the time boy transposes the "Work Numbers" to the corresponding "Job Numbers" by reference to the numerically arranged file of carbon copies of work slips already referred to, making entries on the time-cards showing the "Job Numbers." The time clerk then fills in the rate of wages and the total amount on each coupon and checks the total amount in hours and dollars and cents to agree with the clock card. The time card is simply a series of coupons, each coupon representing a separate "Work Number." The time boy separates these coupons after the time has been checked against the clock card. The various coupons being arranged by job numbers, these coupons are handed to the cost clerk, who transcribes the entries of each on the schedule cost sheet. If the coupon is stamped "Done," the cost clerk rules a red ink line against the top of the column in which the entries for that operation are made. In this way it is easy to see just how far the various operations have progressed by reference to the schedule cost sheet.

The total of the time and money value entered on the cost sheets is checked against the pay-roll every week.

In the shop there is a series of wall pockets to contain the order-of-work tickets, there being three pockets for every machine tool. One of these pockets contains the work at present at the machine, the second contains slips covering all the work for which there is material at the machine (these slips being arranged in the order in which the work is to be done); the third pocket contains the slips for work, the material of which is not yet delivered at the machine.

Bonus Wage System

For all bonus work each man is furnished a memorandum showing the stated time as determined by time study, together with the scheme of bonus premiums which will be paid by reductions of time below the "standard time." (See Fig. 4.) In the establishment of these bonus premiums 25 to 30 per cent. bonus is paid for doing the work in the time determined; inducement is offered before this time is reached and extra remuneration for extra effort. The premium is expressed in dollars and cents and increases at a greater rate than the time reduction. In other words, a man's earnings increase at a more rapid rate than the reductions of time below the stated.

On privately interviewing the superintendent and several mechanics, they all expressed themselves as well satisfied with the system. The key-note of the success of this system at this plant is struck in the remark made several times that employers had found that the company intended to do the fair thing and that as a rule, they had decided that they would make as much money out of the system as they could.

The thought may suggest itself that the company would

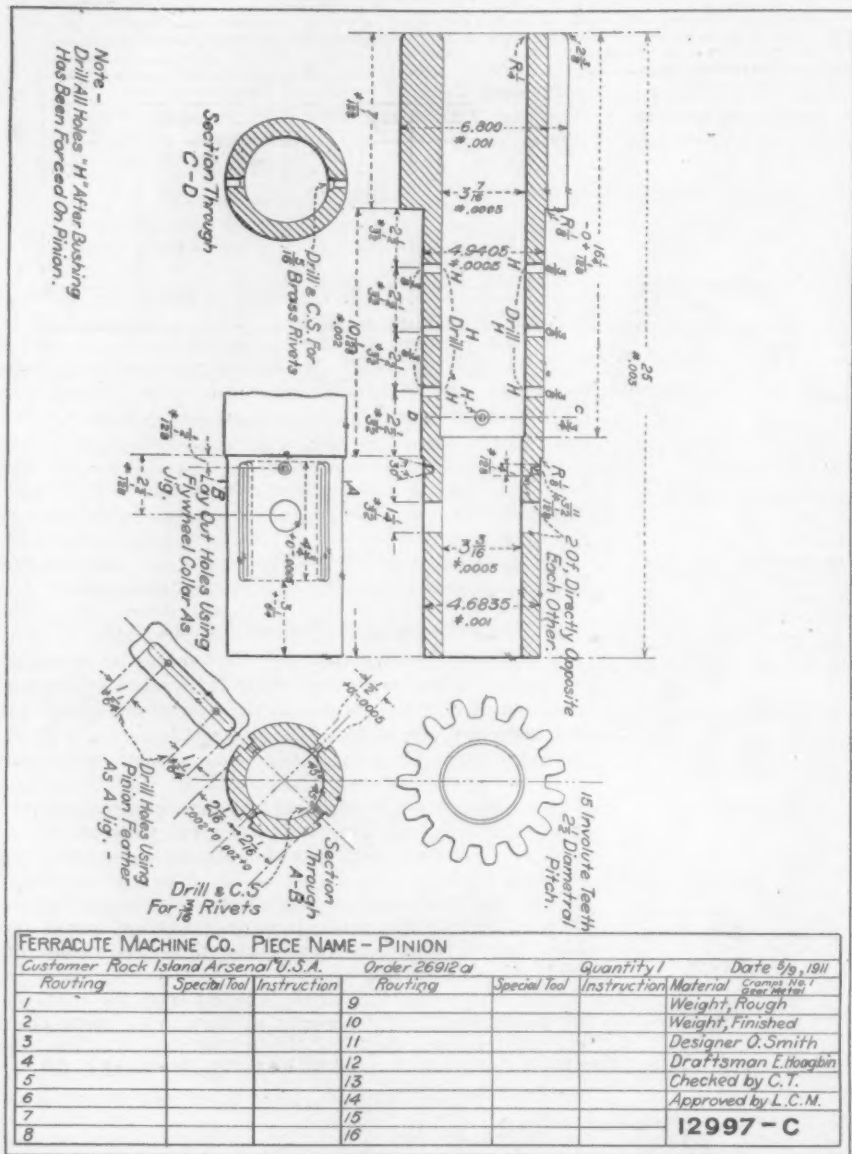


Fig. 5.—Copy of Typical Blueprint from Sketch on Cross-hatched Bond Paper.

schedule cost sheet the production department office copies are turned over to the time-keeper. He makes entries on the schedule cost sheet of labor reported from time to time, each days' entries being made on horizontal lines directly below the last preceding entry. As the order of operations constitutes the headings of vertical columns, the entries of labor made from day to day form a curve showing the progress of work through the shop and in this form the sheet serves also as a tracing record. By adding up the vertical columns, one may also obtain the individual operation costs. Departmental operation costs can be obtained by adding the operations which are done in any one department.

When there is an extra or bonus pay, a special time slip is written out in the factory, approved by the assistant superintendent and the bonus time and pay is entered beneath the regular time in the proper operation column on the schedule cost sheet.

The time boy in the production department writes out a time ticket daily for each man. These time tickets are filled out by the gang bosses for each man. The time clerk in the production department checks them against the clock cards.

TIME STUDY.		FORM F. A. P. 45a.		FERRACUTE MACHINE CO.		
		TIME STUDY NO. _____	SHEETS, SHEET _____			
ARTICLE _____				SYMBOL _____		
SKETCH or DRAWING _____		QUANTITY _____		OPERATION _____		
MAN No. _____		MACH. No. _____		DEPT. _____		
				Work, Job or Order No. _____		
MATERIAL _____		OBSERVER _____		TIME _____ A.M., P.M.		
				DATE _____ 19__		
<small>NOTE.—The observer must exercise extreme care in making time studies to see that the proper sequence of operations is maintained, that all unnecessary operations or moves are eliminated, that proper appliances are provided (including cutting tools in sufficient quantities) and that the proper and most economical combinations of Speed, Feed and Cut are used. When time is slow, due to man's natural slow moves, note (in margin at extreme right below) what time should be for a fast man moving at his best normal speed. Have certain operations repeated if necessary to satisfy yourself that the time is correct and continue to do so until the study is satisfactory.</small>						
Sub-Operation	DETAIL DESCRIPTION OF OPERATIONS, SPEED, CUTS, ETC.	MINUTES and HUNDREDTHS			AVERAGE	SHOULD TAKE
		1	2	3		
1						
2						
44						
45						
46						
TOTALS CARRIED FORWARD						
FINISHED _____		A.M. _____		P.M. _____		
		ELAPSED TIME FOR _____		= _____		MIN.

Fig. 6.—Time Study Data Sheet for Establishing Bonus Wages and Instructions to Workmen.

pay a high penalty if an error were made in rate fixing if the time standard were set too high. The likelihood for such errors is very small, inasmuch as the time standards are all based on observation time study.

Mechanics have made anywhere from \$2 to \$6 per week bonus over their former wages and are very well satisfied.

The company's shop drawings, while they show only the needed dimensions, do show limits of accuracy. The drawing is made to scale in pencil on cross-hatched thin bond paper, and inked in on this same paper, which serves as a tracing for blue-printing. Border lines, instructions as to routing and tools, as well as title plate and border lines are printed on the original paper before blue-printing. A typical drawing is shown in Fig. 5.

Time-Study Observations

The time-study work is under the supervision of the assistant superintendent, who either takes the observations himself or delegates a special time-study man to take them. The results of the time-study are recorded on a form shown in Fig. 6.

With the time-study sheet as a basis a detailed instruction sheet for the workman is prepared for each bonus job, specifying the tool, cut, feed and speed to be used, as per Fig. 7.

High-speed tool steel is used in the machines, which are run at brisk cutting speeds, heavy cuts and coarse feeds wherever feasible. The cut with $\frac{1}{4}$ in. feed made at the surface of a fly-wheel in a boring-mill showed a surface speed of 70 ft. per minute. The superintendent showed with considerable pride a number of pieces of work on which the time has been reduced one-half and more through the medium of the bonus wage system, together with a high degree of mechanical excellence.

Cost of the System

It is declared for this type of organization, production and wage system, that the net profits per year which are resulting from economies due to its introduction and proper operation are considerably more than the increased cost of salaries involved by the use of the system. There is a noteworthy spirit of co-operation on the part of the entire force and an apparent feeling of confidence in and enthusiasm for the success of the system.

INSTRUCTION CARD		Form F. A. P. 35 a		FERRACUTE MACHINE CO.			
NOTE All time is expressed in Hours and Decimals.		INSTRUCTION _____					
		SHEETS, SHEET _____		DATE _____, 19__			
ARTICLE or JOB _____							
OPERATION _____							
Quantity _____	Material _____	Hand or Machine _____	Sketch or Drawing _____				
TOTAL LOT TIME		TOTAL PIECE TIME		BONUS CHART			
SUB OPERATION	DETAIL INSTRUCTIONS	TOOL	CUT	FEED	SPEED	PIECE TIME	LOT TIME
1							
2							
3							
31							
32							
Carried Forward, or TOTAL							
WHEN MACHINE CANNOT BE RUN AS SPECIFIED, CANG BOSS MUST REPORT AT ONCE TO _____							
INSTRUCTION _____							

Fig. 7.—Instruction Card Specifying Tools, etc., in Connection with Time Standard and Bonus.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

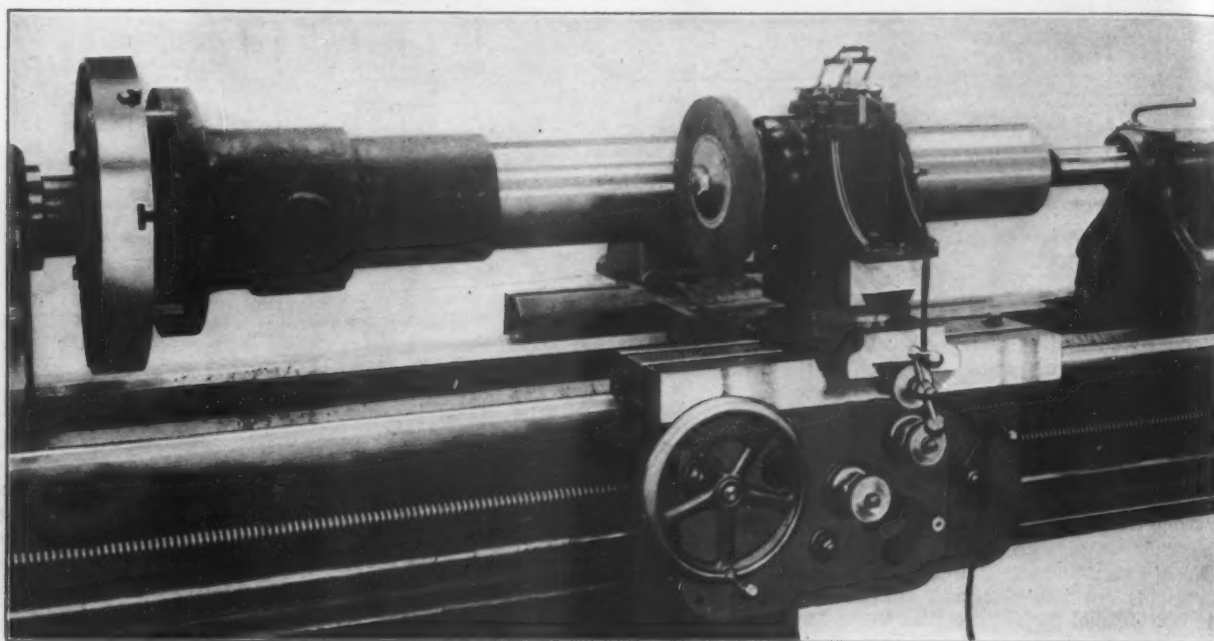
New Parallel Grinder

The Hisey-Wolf Machine Company, Cincinnati, Ohio, is placing on the market a new grinder designed for parallel work. The tool is portable and can be quickly and easily attached or detached, thus enabling great savings in time and labor over the method of moving the work from the lathe to another machine to be effected.

The grinder can be used on a lathe, boring mill, milling machine or planer, and when not needed can be quickly removed. In the accompanying engraving it is shown attached to a lathe for finishing a drill press column which has been rough turned. The method of

purchased for its new furnace plant a condensing turbo-blowing engine from the General Electric Company. The engine will have a capacity to deliver 25,000 cu. ft. of air per mi. against a pressure of 25 lb. per sq. in., but will be designed to be most economical when delivering 20,000 cu. ft. against a pressure of 13 lb. per sq. in.

The Keystone Tube Works, Inc., Pittsburgh, with works at Connellsville, Pa., which recently purchased some additional property adjoining its present plant, is taking bids on some new steel buildings and also on a crane, contracts for which will be awarded about August 1. A material increase in its capacity for the manufacture of steel tubes is intended by the company.



A New Grinder for Parallel Work Made by the Hisey-Wolf Machine Company, Cincinnati, Ohio.

attaching the tool to a lathe is simply to bolt the angle plate in the tool post rest. A vertical adjustment of 4 in. which brings it in line with centers is provided. The bearings are adjustable to compensate the wear and the machine is enclosed in a dust-proof cover. Four sizes of grinder rated at $\frac{1}{2}$, 1, 2 and 3 hp. are built.

The business of the New Process Steel Company, Lancaster, Pa., has been taken over by a new corporation, known as the New Process Steel Corporation, with an authorized capital stock of \$50,000, fully paid in. W. A. Sherwood is president. The former concern, which has been engaged in the manufacture of high-grade material in various shapes, overreached itself and its owners could no longer successfully finance it. The new corporation has taken over the entire plant, assets, and good will of the old company, and is putting into the plant new machinery and increased facilities for handling its business. The product will consist of the best grades of tool steel in all shapes, sizes and forms, and a special alloy steel for the automobile trade. The new management starts off with a good supply of orders, particularly for drawn-steel shapes and special alloy material.

The standard structural shapes now manufactured by the Bethlehem Steel Company, South Bethlehem, Pa., have been made the subject of a 16-page pamphlet. The 28-in. standard structural mill which the company put in operation in June produces standard angles, standard channels and standard I-beams of smaller sizes to supplement the larger sections rolled by the company's Grey mills. In connection with the Bethlehem structural shapes, which are now widely known, it is felt that the addition of the standard shapes affords a larger range of structural shapes applicable to all kinds of steel construction than is offered by any other mill.

The Colonial Iron Company, Riddlesburg, Pa., through its engineers, Frank C. Roberts & Co., Philadelphia, has

The Federal Heater Company

Seven house-heater manufacturing companies have been consolidated in the Federal Heater Company, a corporation organized under the laws of Delaware with \$4,000,000 of 7 per cent. cumulative preferred stock and \$4,200,000 of common stock. It embraces the following concerns: International Heater Company, Utica, N. Y.; Peck-Williamson Heating & Ventilating Company, Cincinnati, Ohio; L. J. Mueller Furnace Company, Milwaukee, Wis.; Twentieth Century Heating & Ventilating Company, Akron, Ohio; Henry & Schreiber Company, Cleveland, Ohio; Quaker Mfg. Company, Chicago, Ill.; Ideal Furnace Company, Detroit, Mich. Holders of preferred and common stock have equal voting rights. The preferred stock is redeemable at any dividend period at 110. The stock is to be listed on the Chicago Stock Exchange. The main office of the company will be in Chicago, but the individual factories are to be operated as heretofore. The combined companies will have a total output of 40,000 heaters a year, and the combined profits of the constituent companies in 1910 are given as \$450,000. They produce warm-air furnaces, hot-water and steam boilers for heating purposes designed for both coal and gas, tank heaters, piping, casings, fittings and registers. The officers of the company are as follows: President, A. W. Williamson; vice-presidents, L. J. Mueller and John Kerch; secretary, D. M. Compton; treasurer, F. H. Moore.

J. Kearny Rice has been appointed receiver for the Ball & Wood Company, 50 Church street, New York. The company makes automatic cut-off engines and its plant is at Elizabeth, N. J.

The Thomas D. Prosser Company, Schmulbach Building, Wheeling, W. Va., dealer in pig iron, coke, cinder, scale, and general construction materials, has arranged to represent the Universal Portland Cement Company, Pittsburgh, and has also secured the sales agency for the Walker Brick & Tile Company, Dillonvale, Ohio, maker of common red and face brick.

Automatic Oiling System

Employing a Combination of Pressure and Gravity

A new system for lubricating an engine and filtering the oil automatically has been recently developed and placed on the market by the Burt Mfg. Company, Akron, Ohio. A distinctive feature of this system, which is said to embody important improvements over former methods of lubrication, is that the oil is delivered to the various

practically self-contained and reliable system, which not only effects a saving in the amount of oil used, but also does away with the necessity of watching a number of small oil cups. In this system the new oil is not mixed with that which has been used until the latter has been filtered a number of times and the supply becomes low, and as the oil is being filtered continuously and much more frequently than in the ordinary gravity systems, a copious supply of oil, free at all times from grit and foreign substances, is provided for all the bearings. The system is an adaptation of an arrangement for lubricating auto-

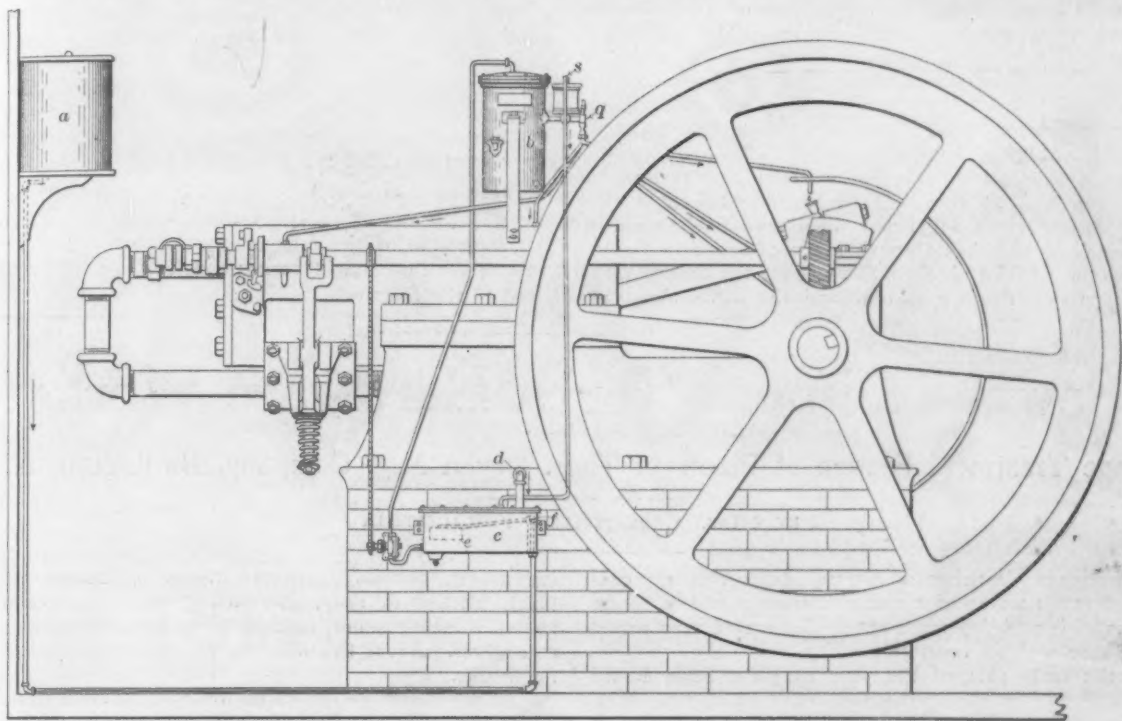


Fig. 1.—A New Combination Pressure and Gravity Lubricating System, Made by the Burt Mfg. Company, Akron, Ohio.

bearings of a stationary engine by pressure and gravity combined. Fig. 1 gives a view of the complete system, while Figs. 2 and 3 show an exterior side and a sectional elevation of the filter respectively.

It is claimed for the system that it is entirely automatic in operation until the supply of lubricant needs replenishing, which is not oftener than every four or six

mobile engines, and was thoroughly tested in actual service for more than a year before being applied to stationary engines.

The essential parts of the system are an oil reservoir, *a*, Fig. 1, the filter *b*, an automatic drain tank, *c*, a gear-driven pump for circulating the oil through the system, sight feeds, a pressure equalizer and fittings. The oil

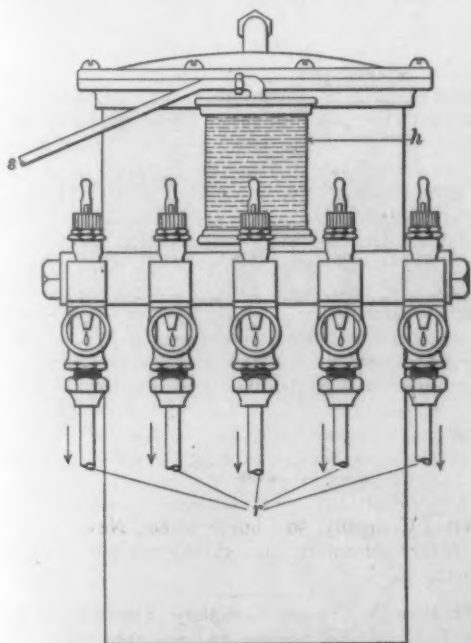


Fig. 2.—Side Elevation of the Filter.

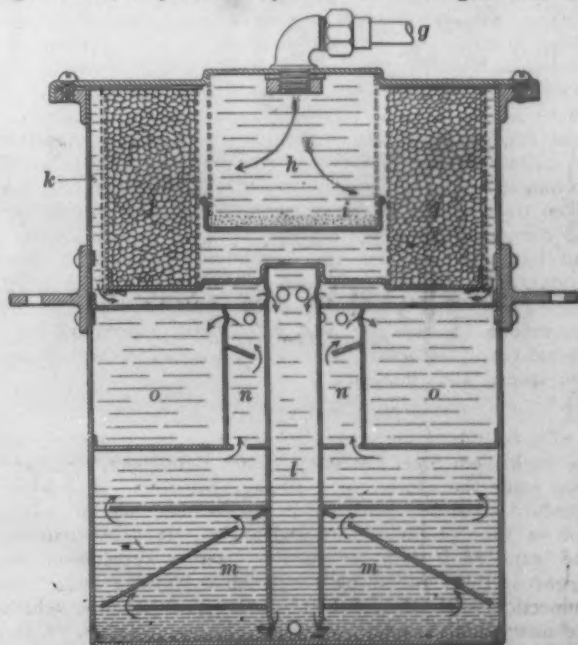


Fig. 3.—Sectional Elevation of the Filter, Showing Constructional Details.

months, and at this time the filter should be thoroughly cleaned, an operation which requires about 30 min. Among the advantages claimed for this system are that it is a

reservoir is placed in any convenient location, and a pipe connects it with the float chamber of the drain tank. A small pump driven by a chain from the engine forces the

oil from the drain tank through the filter, and from the latter the lubricant is carried to the bearings by a combination of pressure and gravity. The drippings from the bearings are collected in drain troughs along the engine bed, and flow by gravity through a drip pipe, *d*, back to the drain tank, and from here the used oil is pumped back into the filter. The supply of oil in the drain tank is automatically regulated by a float, *e*, and an attached ball valve, *f*. The former rises and falls with the variation in the level of the oil in the drain chamber, and when the supply of lubricant in the system gets to a predetermined low point it opens the ball valve and the pump automatically draws fresh oil into the system from the reservoir.

The filter used is small, and is claimed to be very efficient and free from intricate mechanism, as no valves or other parts likely to become worn or loose are employed in its construction. The oil is delivered to the filter through the inlet *g*, Fig. 2, at the top of the filter, and passes through a fine screen cylinder, *h*, having a removable sediment pan, *i*, at the base to facilitate cleaning. It next passes through a cylinder filled with finely divided bone black, *j*, and then through a ply of specially woven filter cloth, *k*. The oil then flows down the central tube *l*, and, passing through and around the baffle plates at

the lower end, rises to the top of the water compartment *m*, in which it is thoroughly washed and cooled. From here it goes through the water separator *n*, and splash arrestor into the pure oil reservoir *o*, with which the outlet to the system is connected.

A glass pressure equalizer, *p*, Fig. 2, and a manifold, *q*, having the required number of feeds *r*, are attached to the filter outlet. This pressure equalizer is a glass arrangement of sufficient size to enable the engineer to see from any part of the engine room whether or not the system is working properly, the evidence of an ample supply of oil in the system being indicated by its appearance in the equalizer. The amount of lubricant fed to the bearings is regulated by the sight feeds, but the equalizer, as its name indicates, makes the pressure uniform on all of them. An overflow, *s*, connects the equalizer with the drain tank. The filter is made in two styles, brass being employed for one and galvanized iron painted to represent aluminum being used for the other.

Three sizes of filter are made, having reservoir capacities of 5, 10 and 20 gal. of water respectively. An inlet on the outside of the filter at the left of Fig. 2 and a drain at the lower right corner enables fresh water to be added to the filter.

Sewage Disposal for a Hardware Works

Sewage Treatment System at Plants of Thos. Devlin Mfg. Company, Burlington, N. J.

BY CHAS. A. BLATCHLEY, PHILADELPHIA

This paper describes a disposal plant recently constructed at the works of a manufacturing company, where the service is probably more severe and varied than would be the case with an institution.

In the early part of the year 1909 the State Board of Health of New Jersey notified the Thos. Devlin Mfg. Company, whose works are located at Burlington, that it must cease to discharge sewage and waste water from the plant directly into the Delaware River, and must provide some other approved means of disposal.

The question of entering into a long-term contract with the local sewage company was given careful consideration,

ing rooms, tumbling department, sorting rooms, power plant, blacksmith shop, galvanizing department, storage rooms, washing rooms, machine shop, tapping department, and offices. About five hundred men are employed about the works.

In the old sewage system the roof and surface drainage water were collected into the main sewers and discharged into the river with the sewage and waste water from the plant. In the construction of the disposal plant the sewage and waste water have been diverted to a new set of mains, the old mains being still used to carry the drainage water direct to the river. In this way the required size

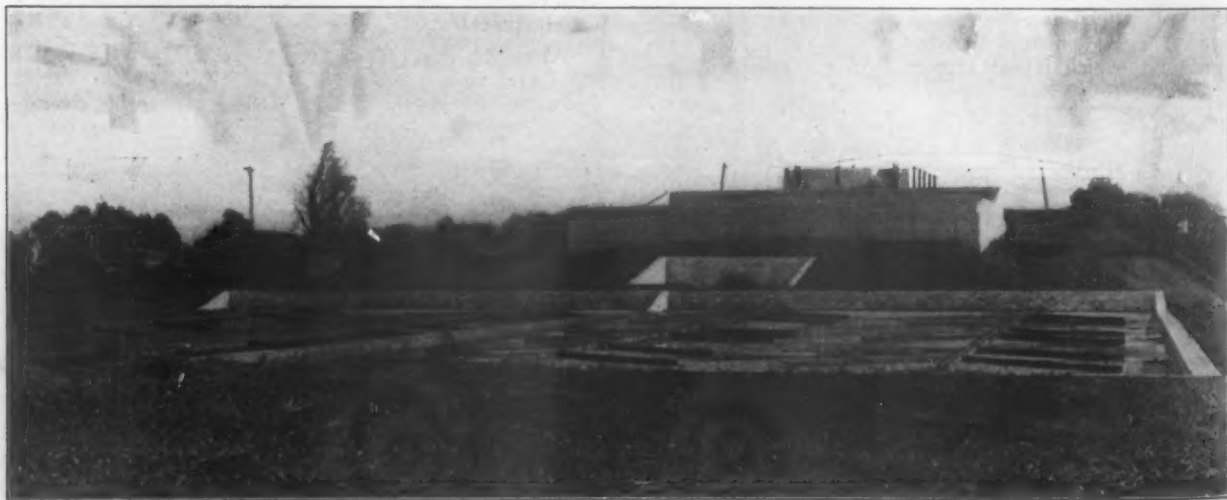


Fig. 1.—A Sewage Disposal Plant for a Hardware Works—General View from the River Bank.

the location and levels of main sewers and their sizes, together with the limitations in the capacity of the plant, being thoroughly investigated before action was taken. As a result of these investigations the Thos. Devlin Mfg. Company decided to install a private sewage disposal plant at its works, located directly west of the town of Burlington and on the bank of the Delaware River. Small hardware and malleable iron pipe fittings are the chief products manufactured.

The group of buildings to be cared for by the sewage plant consists of the foundry and core-making department, pattern shops, drafting room, buckle department, anneal-

ing department, tumbling department, sorting rooms, power plant, blacksmith shop, galvanizing department, storage rooms, washing rooms, machine shop, tapping department, and offices. About five hundred men are employed about the works.

The disposal plant, which is situated about 500 ft. west of the works, consists of a collecting well, septic tank, douching basin, stone filter, settling basin, sand filter and sludge pit. The relative locations of the various units are shown in Fig. 1, which is a photograph of the plant as seen from the river bank. The sand beds are shown in the foreground, with the stone filter and septic tank on the higher elevations in the background.

The works are in operation 10 hr. per day, the sewage

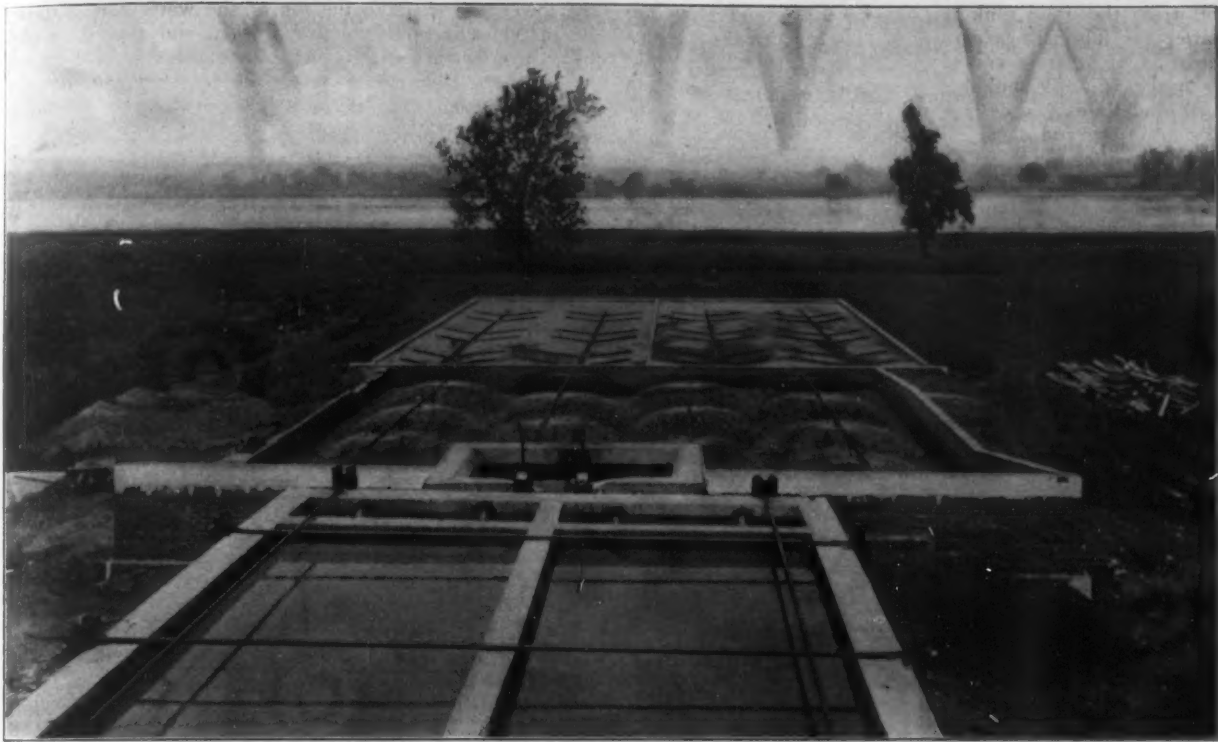


Fig. 2.—The Septic Tank, Showing Discharge End, and the Douching Basin.

running only during that time. The amount handled per hour from toilets, lavatories, etc., is about 3000 gal.; while about 500 gal. additional is received from washing tanks, tapping machine wastes, etc. In this latter quantity there is about $\frac{1}{2}$ per cent., by volume, of muriatic acid. The present flow of sewage is thus about 35,000 gal. per 10-hr. day. In order, however, to provide for the growth of the works the disposal plant has been designed to handle 50,000 gal. per 10-hr. day.

The main sewage discharges by gravity into the collecting or receiving well, not shown in the illustrations, 10 ft. in diameter, constructed with brick sides and concrete bottom, the main sewer entering the well about $4\frac{1}{2}$ ft. above the bottom, thus giving a capacity of about 2700 gal. or 45 min. flow of sewage. The sewage is lifted from the well by means of submerged centrifugal pumps, and raised to the septic tank, which is located about 250 ft. west of, and at an elevation of 30 ft. above the wall. There are two pumps, one located on the bottom of the wall, and

the other about a foot below the sewer inlet, operated by direct connected electric motors, provided with automatic float control. The floats are so adjusted that both pumps start up when the water level has reached the mouth of the inlet sewer; the upper pump taking out the scum and floating sludge from the surface while the lower pump takes the water and heavier matter. The float controlling the upper pump is arranged to stop this pump when the water level has dropped to its suction inlet; the lower pump continuing to run until the well is emptied. With both pumps in service the well can be emptied from the maximum level in 26 min. The pumps then lie idle for 45 min. while the well is again filling. A pump house has been built over the well for housing the motors and electrical equipment.

After the sewage has been pumped from the well to the septic tank it passes by gravity through the various basins and filters, until finally discharged into the river.

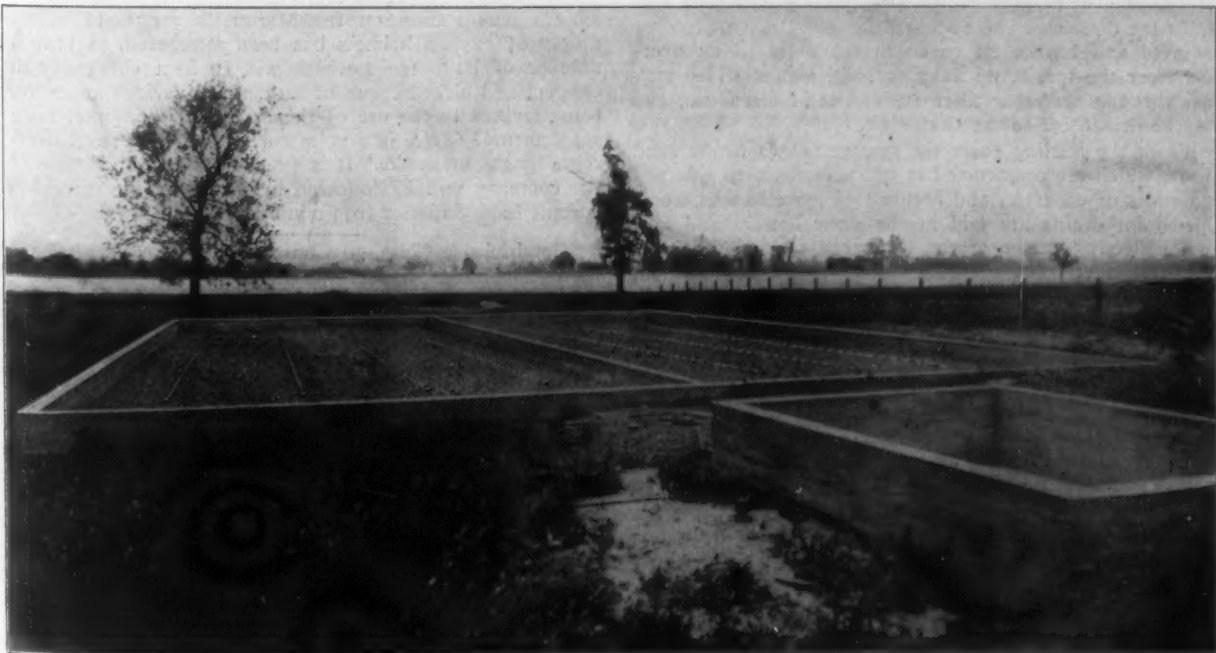


Fig. 3.—Sand Filters Under Construction, Showing the Broken Stone Bottom with Drain Pipes in Position—Settling Basin in Foreground.

The septic tank is constructed of reinforced concrete. The bottom pitches to a collecting gutter at the discharge end. The tank is divided longitudinally in the center by a vertical partition, thus forming two independent sections. Baffle plates extend down from the top of the tank at both the receiving and discharge ends. Both the inlet and outlet pipes enter the ends of the tank near the top, the baffle plates, referred to above, preventing agitation of the sewage in the main body of the tank. A thick scum forms over this main portion, which keeps down all objectionable odor. The inlet and outlet pipes are divided, permitting of either side of the tank being operated while the other is being cleaned or repaired.

A pipe line leads from the collecting gutter in the bottom of each half of the tank to the sludge pit; into this the contents of the tank may be discharged when desired. In the foreground of Fig. 2 is seen the discharge end of the tank, with baffle plates and discharge pipes. The sewage is discharged from the septic tank into the douching basin, also constructed of concrete, seen immediately ahead of the septic tank in Fig. 2. At the bottom of the basin is a Miller bell and syphon, by means of which an intermittent discharge is obtained over the sprinkling filter without loss of head and with a minimum of agitation in the septic tank. It is also possible to predetermine accurately and maintain the quantity of each douch.

The intermittent discharge from the douching basin is distributed over the surface of the stone filter by pipe lines supported above the filter bed. Each distributing pipe contains sprinkling heads, located at regular intervals. The pipes are graded for gravity flow, and reduce in size after passing each sprinkling nozzle. The inverted type of Taylor sprinkling nozzles are used and the nozzles are staggered on alternate distributing pipes.

When the sewage in the douching basin has reached the predetermined height, syphoning action commences, the sewage discharges through the distributing pipes to the various sprinkling nozzles, and the spraying action starts under a maximum head, and therefore with rings of spray of a maximum diameter. As the head in the douching basin falls during discharge, the rings of spray from the sprinkling nozzles will contract in diameter until, when the douching basin is practically empty and the discharge is about to stop, the nozzles are discharging but a small stream on a point directly beneath them. In this way a uniform distribution of the sewage is obtained over the entire filter bed at each discharge of the douching basin. The sprinkling nozzles are shown in action in the center of Fig. 2. The distributing pipes are arranged so that either half or all of the filter may be used as desired.

A series of flushing pipes of varying lengths are located along the bottom of the filter bed, by means of which water under pressure may be forced through the stone bed for cleansing.

The effluent from the filter flows from a collecting gutter in the discharge end to a settling basin, constructed of concrete and having an outlet in the form of an overflow near the top. Any flaky or solid matter which may pass through the stone filter settles out in this basin, and may be drawn off to the sludge pit.

From the settling basin the sewage passes to the sand filters, which are constructed in two sections with side and end walls of concrete, and bottoms of loose broken stone. Open-joint drains are laid in the stone bottom and lead to a collecting gutter at the discharge end of the beds. Fig. 3 is a view of the sand filters under construction, showing the broken stone bottom with the drain pipes in position. The settling basin described above is shown in the foreground in this figure.

The filtering material is composed of selected and well-washed river sand; and on the surface of this is laid distributing tile. These are laid with open joints and with a number of smaller branches on either side of the main channels, thus insuring a thorough and uniform distribution of the material to be filtered over the entire bed.

The sand beds are designed for use one at a time, each one being in service every alternate two days, thus permitting the surface of each bed to become well aerated. In the background of Fig. 2 are shown the completed beds in operation. The effluent from the sand filter is discharged to the river through an underground pipe line.

The data in the accompanying table are taken from the report of the State Board of Health on the chemical and

bacteriological analysis of catch samples of the raw sewage and final effluent:

Analysis Showing Efficacy of Sewage Treatment.

	Raw Sewage.	Effluent.
Solids in susp.....	400	0
Fixed solids in susp.....	74	0
Volatile solids in susp.....	326	0
Oxygen consumed.....	126	
Oxygen consumed in sol.....	30	
Oxygen dissolved.....	...	8.4
Iron.....	...	35
Turbidity.....	2,000	0
Sediment.....	15,000	0
Bacteria per cc. 20 deg.....	63,000	less than 1000
Bacteria per cc. 37 deg.....	30,000	less than 1000
Red colonies 37 deg.....	30,000	less than 1000
B. coli per cc.....	10,000	less than 1000
Putrescibility.....	...	Over 14 days

While these results are well within the State's requirements, they are constantly improving as the employees become more familiar with the care and operation of the plant.

The average maintenance costs since the plant has been in operation (the plant was first started in October, 1909) are less than 40 cents per day; and the required attention has amounted to the time of one man on an average of about one hour a day. The total cost of labor and material for the construction of the plant amounted to \$9,100. The plans and specifications for the plant were prepared and the construction supervised by the author. The work was performed by day labor under the direction of John Hercker, superintendent of the works.

The author is indebted to the State Board of Health, especially H. M. Herbert, chief of division of sewerage and water supply, and Chas. Daniels, chief chemist and bacteriologist, for their co-operation and assistance during the early stages of the preparation of the plans, and in the determining upon the proper type and design of plant to best produce the results desired.

It may be added that the question of acidulated and oily waters was taken up with the State Board of Health prior to the design for the plant, and after a careful study of records and experiences along these lines, the chief chemist of the board decided that the proportion of acid and grease in the sewage of this plant would not be in excess of, if equal to, that usually found in the general sewage disposal plant of a town where the great portion of the sewage is waste from kitchen sinks and also contains large quantities of soapy water.

The portion of acid in the waste from the machines amounts to $\frac{1}{2}$ per cent. by volume, and when this is mixed with the general sewage from the plant the proportion is not over 0.07 per cent. The operation of the plant has borne out the decision of the chief chemist, and we have found that this small proportion of acid does not in any way interfere with the bacteriological process and satisfactory purification of the sewage.

The Cleveland Cliffs Iron Company has established a mine rescue station on the Marquette range, Mich. A supply of oxygen helmets has been purchased, as have a number of large tanks which will be kept charged with oxygen, and picked crews of men at the various mines are being trained to the use of the apparatus. An interesting supplemental device is a pulmotor, to revive persons overcome by gas or smoke. It is expected that the example of the company will be followed by others of the more important Lake Superior iron mining operators.

Hendricks & Class, 30 Church street, New York, have been appointed representatives for New York City, Brooklyn, Jersey City and adjacent territory for the C. C. & E. P. Townsend Company, New Brighton, Pa., manufacturer of rivets, wire nails and wire.

The New York Supreme Court has declared constitutional the law under which the New York City fire commissioner ordered the installation of sprinkler systems in factories. Thousands of manufacturing plants of all descriptions are affected, and the amount of money involved in carrying out the requirements of the order is estimated in very large figures.

The Orenstein-Arthur Koppel Company, Pittsburgh, Pa., states that the agricultural department of its branch house at Johannesburg, South Africa, is in the market for agricultural implements, comprising hay presses, corn shellers, portable forage presses, feed and ensilage cutters, grain threshers and corn huskers.

The Machinery Markets

While the usual summer dullness generally prevails in the machinery trade, in some sections the market has taken on a better tone. This is observed in Cincinnati, where increased inquiries are coming out and the foundries in that vicinity are extending their operations. The railroads are buying more freely in the Cincinnati market, especially in the way of small shop supplies. The outlook in Cleveland is good, but the warm weather has interfered with immediate business. Engines and boilers are selling well in the Cleveland market. A slight gain in trade is noted in St. Louis and machine tool dealers are doing about 60 per cent. of their normal business. Inquiries are coming out slowly in Detroit, but there is a better call for electrical equipment. The demand for machine tools is greatly increasing on the Pacific coast, and there is a good volume of export business to the Orient. In Texas there is a great demand for irrigation machinery. In New York, Philadelphia and New England trade is quiet.

New York

NEW YORK, July 12, 1911.

There is no doubt that the warm weather which prevailed in this vicinity during the last week has affected the machinery trade materially, as many prospective buyers show no disposition to discuss business and are putting purchases off. Inquiries are scarce and there is nothing in the way of lists. It was hoped that the New York Central Railroad would begin its buying before this time, but the large list it has out has not been filled. Floor sales have fallen off, as many people who make it a rule to place orders for machinery when their business brings them into New York have deferred their purchasing. Considering that this is a vacation season a dull business is expected at this time, but nevertheless the buying during the week was small compared with what the inquiries lead the dealers to expect.

The Newark Automobile Mfg. Company has purchased a large plot of land on Bigelow street, that city, on which it will erect a one-story brick building, 75 x 100 ft. The company is now buying machinery to equip the plant. The requirements include a general line of tools, equipped with motor drive. The company proposes to manufacture industrial trucks of one-half ton and one-ton capacity. Later on larger machines will be manufactured. Joseph J. Rafter, 800 Broad street, Newark, is president of the company.

The Fire Department of New York will receive bids at 157-169 East Sixty-seventh street, on Monday, July 17, on one of the largest lists of mill supplies issued in the trade this year. The equipment will include valves of all descriptions, couplings, oil feeders, oil cups, sight feed glasses, lubricating devices, valve reseating machines, reamers, cutting and threading machines, twist drills, machine taps and an extensive line of heavy hardware. The list covers 24 pages of typewritten matter.

The Hawley Down Draft Furnace Company, Chicago, Ill., has acquired a nine-acre site with connection with the Lehigh Valley Railroad in the suburbs of Easton, Pa., and is reported to have plans prepared for the erection of a large plant there.

John Crossley & Sons, Halifax, England, carpet manufacturers, have secured through the Board of Trade at Easton, Pa., a 15-acre tract with the view to establishing a branch plant for the manufacture of carpets, rugs, etc. The general contract for the first of the buildings has been let and bids for the construction work will be received soon.

The Illuminating Products Company, Newark, N. J., has been incorporated with \$25,000 capital stock to manufacture a new design of flaming arc lamp, sign lamp transformers, etc. The company has plans for a factory in Newark and will begin construction work as soon as a suitable site can be secured. The affairs of the company are in the hands of Steinharter & Jost, 320 Broadway, New York.

The Eastern Sanitary Mfg. Company, 299 Broadway, New York, has been incorporated with \$150,000 capital stock to manufacture a line of plumbers' supplies, etc. The incorporators are A. W. Shipman, A. H. White and F. N. Dede.

John Pells & Son, Inc., manufacturers of shoe lasts, 86 Mechanic street, Newark, N. J., will build a two-story and basement factory, 60 x 200 ft., at Tichenor and Hermon streets, Newark. The building will cost about \$40,000, and it will be equipped with up-to-date wood-working machinery.

Business Changes

The firm name of the Omaska Tractor Mfg. & Foundry Company, St. Louis, Mo., has been changed to the Downs Tractor Company.

New England

BOSTON, Mass., July 11, 1911.

The intense heat has, of course, had a serious effect upon business. Not much has been done by the machine tool dealers and the manufacturers have noticed a similar condition in their mail. Many plants were shut down for the regular summer vacation, and in some cases, because of a desire to curtail production, while other works were compelled to close because of the abnormally high temperature. The general stimulus to manufacturing is naturally slow to be felt on account of the season.

The report from the cotton crop indicates an exceptionally great yield. If nothing happens in the meantime to reduce the present estimate New England will undoubtedly be a large gainer industrially. The business of the cotton mills has been seriously affected by the high price of the raw material and more or less curtailment has been necessary. The consumption of cotton cloth has fallen to a very low point; buying has been light all along the line to the ultimate consumer, with the resultant promise of a very large demand later, for it is generally believed that a sharp decline in prices will bring a large buying movement which would put the mills on full time with maximum working forces. The cotton industry constitutes a very important factor in the metal trades of this territory. Here are located very large works for the manufacture of textile machinery. Also the requirements for general mill equipment and supplies total large figures. The textile machinery business has been dull, as a general rule, for a year or more, and the effect of a large cotton crop should be felt soon after the harvest has been gathered.

The Henry & Wright Mfg. Company, Hartford, Conn., manufacturer of sensitive and radial drilling machines, has purchased about six acres of land at Detroit, Mich., fronting on Kircheval avenue and siding on the Michigan Central Railroad, and is having plans prepared for a factory covering approximately 30,000 sq. ft. of floor space. The business will be removed from Hartford as soon as the new works are ready for occupancy. The company plans to create shops modern in every respect, and work on the buildings will commence as soon as the plans are completed and the contracts can be awarded. It will probably be nearly the first of the year before the removal can be made. The new works will give the company very largely increased manufacturing space which is required because of the rapid growth of the business. The intention had been to build the new establishment in Hartford, but it was finally decided that a location in the Middle West would be more desirable. The business is comparatively young and has been exceedingly successful. R. G. Henry is the president of the company; Joseph H. King, vice-president, and D. M. Wright, secretary and treasurer.

The Smith-Delahanty Electric Pump Company, Inc., 12 Warner street, Hartford, Conn., has organized under a Connecticut charter with M. B. Smith as president and John J. Delahanty, secretary and treasurer. The company will make a specialty of a rotary pump that it has developed, and also of a piston for automobile engines for which a patent has been issued and for which a very high efficiency is claimed. Other products will be electric governors and electric switches.

At the annual meeting of the Sessions Foundry Company, Bristol, Conn., William E. Sessions, who has held the offices of president and treasurer, relinquished the treasurership in favor of his son, Joseph B. Sessions, who will assist in the management of the finances and will also devote his time to purchases and the general management of the plant. William Kenneth Sessions, another son, was elected vice-president succeeding his brother. He will be connected with the sales depart-

THE MACHINERY MARKETS

ment which is in direct charge of Arthur T. Woodford, the secretary.

The G. W. Bradley's Sons, Inc., Westport, Conn., have closed negotiations for the erection of a new factory at Peekskill, N. Y. Details regarding equipment, the size of the structure, floor plans, location, etc., have not been formulated. The company manufactures axes and edge tools, the business being a very old one, dating from 1832. The works at Westport were destroyed by fire recently.

It is announced at Springfield, Mass., that the plant of the Otis Elevator Company has been purchased by the Hendee Mfg. Company, of that city, manufacturer of motor cycles. It is understood that the property will be used for the future extension of the Hendee business.

Additions to general manufacturing plants in New England include the following: The A. C. Peabody Leather Company, Peabody, Mass., five-story factory, 49 x 152 ft., of reinforced concrete construction; the B. & R. Rubber Company, North Brookfield, Mass., an additional brick factory, 25 x 150 ft. and one story; the Farley Paper Company, Greenfield, Mass., two new buildings, one 36 x 320 ft., one story, the other 40 x 94 ft., two stories; the Fisk Rubber Company, Chicopee Falls, Mass., factory buildings, 59 x 91 ft., and 30 x 58 ft., and an office building, 49 x 210 ft.

Philadelphia

PHILADELPHIA, Pa., July 11, 1911.

The trade is simply marking time, and little of importance is expected to develop in the immediate future. Orders have been mostly for single tools and have been pretty well scattered. One small shop equipment, covering the general range of tools, has been contracted for. With the exception of an occasional single tool, the demand for equipment on the part of the railroads in this district is practically at a standstill. Manufacturers in a number of instances observed a three-day holiday over July 4 and plant operations have, therefore, been irregular.

The demand for second-hand tools, machinery and power equipment has been light.

The Pennsylvania Railroad has sent out an inquiry for a 1½-in. bolt header.

The County Commissioners, Berks County, Reading, Pa., will shortly invite proposals for the construction of a reinforced concrete bridge over the Schuylkill River at Penn street, Reading, Pa.; it is estimated that from 30,000 to 40,000 barrels of cement will be required.

Contractors are estimating on the new plant to be erected for the A. H. & F. H. Lippincott Company at Twenty-fourth and Locust streets.

Penckert & Wunder, engineers and architects, have completed plans and asked for bids for the construction of a five-story brick and stone warehouse 30 x 161 ft., to be erected at 107-109 De Lacey street for Stohrers Keystone Pickle Works. The building is to be of slow burning mill construction with fire tower, electric power elevator and electric lighting.

Proposals will be opened July 18 for a quantity of naval supplies for the League Island Navy Yard, including under schedule 3735 files, and under schedule 3740 steel oil tank and lockers. Specifications may be obtained from the Navy Pay Office, Philadelphia, or from the Bureau of Supplies and Accounts, Washington, D. C.

Revised bids have been received by the property committee of the Board of Education for building the proposed new West Philadelphia High School Building, original proposals having exceeded the appropriation. The proposition of withholding the contract for the electric and power installation until the buildings are approaching completion is being considered; this would reduce the cost, now estimated at \$1,248,840, by nearly \$200,000. Final awards for the work are expected to be made in about a week.

The American Pattern Company reports business as having been quite active and the plant is now fairly busy on a general line of work. This concern recently delivered to the Lorain Steel Company, Johnstown, Pa., a shipment of two carloads of wood patterns for frog and switch work.

The Board of Awards, Baltimore, Md., has, it is stated, awarded the contract for supplying the pumping engines for its Mount Royal pumping station to the Bethlehem Steel Company at a bid of \$114,000. The same board has also awarded a contract for the construction of the first section of the Jones Falls sewer to M. M. Elkan, Macon, Ga., at a cost of \$533,990. Plans and specifications for the building of the second section

of this extensive sewerage system are now being prepared by the city engineer.

A charter has been granted to the West Lebanon Electric Light & Power Company, Lebanon, Pa., for the purpose of providing electricity for light and power in that township. The incorporators named are Daniel Weaver, Jacob B. Weaver, Henry Weaver, R. S. Bickler and John S. Weaver. The company is organized with a nominal capital stock of \$5,000.

Ballinger & Perrot, engineers, have completed plans and asked for bids for the construction of a five-story concrete factory 55 x 121 ft. to be built for the Esterbrook Steel Pen Mfg. Company, Camden, N. J. The company is not yet prepared to consider the purchase of power and mechanical equipment required for the new addition.

Cleveland

CLEVELAND, OHIO, July 11, 1911.

The improvement in the local machinery market noted recently has not been maintained during the past week. Blame for the falling off in orders is placed on the intensely hot weather that prevailed for several days. Buyers showed a disposition to attend to only such business as was absolutely necessary, and the closing of some pending negotiations for machinery was postponed. In spite of the dullness the improved feeling in the trade continues, and while not a great deal of activity in machine tool lines is expected during July and August, dealers are looking for a fair volume of business in the fall. The demand for machinery for new manufacturing plants in metal working lines is rather limited, as work of this character in many cases is being held up. Machine tool orders are very scattering, purchases being largely to replace old tools or because buyers are adding new products and need some equipment different from what they already have. Orders for engines and boilers are fairly good. The demand for electrical equipment in small units is quite active. Building operations in this city in the line of office and mercantile structures continue active, so that there is a good demand for power, heating and lighting equipment. Railroads in this territory are buying practically nothing in the line of machine tool equipment. The demand for second hand tools is light. Not as many used tools are being placed on the market as there were a few weeks ago.

The Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, will build a new erecting shop. Plans for the building have been prepared by the Roberts & Abbott Company, engineers, Cleveland, and contracts for its erection will be placed shortly by the press manufacturing company. The building will be about 50 x 100 ft. of brick and steel construction. It will be equipped with a 20-ton electric crane and will be so located that a railroad siding will run into one end of the building.

Contracts will be placed shortly for 12 or more 1 to 10-hp. motors, five or six electric elevators and other electrical equipment and the steam piping for power and heating for the new warehouse and manufacturing plant of the William Edwards Company, Cleveland, wholesale grocer. Contracts already placed include a 225 and a 75-kw. generator given to the Triumph Electric Company, two engines awarded to the Ball Engine Company and two boilers to the McNaul Boiler Mfg. Company, Toledo, Ohio. F. C. Werk, engineer, New England Building, is in charge of placing the orders for the mechanical equipment.

The Champion Bed Spring Company, Cleveland, has let contracts for the erection of a new plant at 3715 Iron court. It will be 65 x 300 ft., three stories, of reinforced concrete. The company will make kitchen tables in addition to bed springs. Some new metal working and wood working machinery will be required. J. P. Macbeth is president and treasurer.

Contracts will be placed shortly for a large amount of electrical equipment for the new Statler Hotel, Cleveland. No power plant will be installed, electricity for power being furnished by a commercial company. George B. Post & Sons, Cleveland office, 1111 Schofield Building, are the architects.

The Kinsey Mfg. Company, Toledo, Ohio, will shortly begin the erection of two buildings that will enable it to increase its output of automobile supplies one-third. One building will be 80 x 100 ft., four stories, and the other a one-story saw-tooth building 100 x 100 ft.

The U. S. Automatic Company, Amherst, Ohio, has awarded a contract for the erection of a new factory

THE MACHINERY MARKETS

building. It will be 50 x 126 ft., of brick and steel construction.

The City Council of Cleveland has authorized the expenditure of \$200,000 for the construction and equipment of a new downtown high pressure pumping station and \$700,000 for the construction of a new West Side water tunnel.

The General Fireproofing Company, Youngstown, Ohio, will build a large four-story reinforced concrete addition to its plant.

The Defiance Tick Mitten Company will erect a new branch factory in Toledo, having just acquired a site on Indiana and Avondale avenues and Hawley street.

Fire in Ironton, Ohio, June 30, destroyed the plants of the Ward Lumber Company, the Allen Roller Coaster Company and the Ironton Tool Handle Company. Considerable machinery was destroyed.

Detroit

DETROIT, MICH., July 10, 1911.

New business seems to be rather scarce in the machinery market, and there is an absence of any buying in quantity. Inquiries for standard lines of machine tools are coming out very slowly, the business done being almost entirely on a single tool basis. The dealers in small tools, however, continue to report a very fair business and there is some demand for electrical machinery. The combination of the national holiday and the protracted spell of hot weather has caused many factories to operate in an irregular manner and a number of plants in the hot metal trades have posted notices of closing for one or two weeks. Business in building lines is quite active, figures being asked for a considerable amount of new work, and some good-sized contracts being awarded.

An important feature of the week was the announcement by the Cadillac Motor Car Company that extensive additions to the present plant have been decided upon. The company recently acquired a large parcel of ground adjoining its Trombly avenue plant, including a building 60 x 320 ft., occupied by the Hayes Mfg. Company. The new buildings will consist of an addition to the iron foundry 72 x 220 ft., a brass foundry 50 x 140 ft., and a three-story manufacturing building 60 x 270 ft. Two additional stories will be added to the Fort street body building plant, 60 x 428 ft. and 60 x 76 ft., respectively. There will also be constructed modern molders' sand bins of concrete, 50 x 288 ft. W. C. Leland, general manager of the company, states that the output for the coming season will be considerably enlarged and the increased capacity is to take care of the rapidly increasing business.

In addition to the extensions to the Ford Motor Company's plant recently announced the company will erect a new machine shop 260 x 560 ft., and a large craneway between this and the new manufacturing building. Contracts for the erection of the new buildings have been awarded to the W. E. Wood Construction Company of this city.

The Abbott Motor Company has decided to increase its capital stock from \$300,000 to \$1,000,000 to take care of increasing business. Officials of the company state, however, that no steps will be taken at present to enlarge the plant.

The Yeomans Box Company, manufacturer of boxes and crates, has filed notice of an increase of capital stock from \$50,000 to \$100,000.

The Detroit Concrete Receptacle Company has been incorporated with a capital stock of \$25,000 to manufacture a sanitary garbage receptacle. M. E. Von Mac and Joseph B. Urban are the principal stockholders.

The Zenith Carburetor Company has incorporated with a capital stock of \$10,000, and will manufacture carburetors and other automobile accessories. Victor R. Heftler is the principal stockholder.

A new automobile company of considerable importance has been incorporated this week with a capital stock of \$100,000 to be known as the Bantam Motor Truck Company. The men behind the new enterprise are Hiram H. Walker, George D. Bantam and Jacob M. Stickle.

The Turner & Moore Mfg. Company has been organized with a capital stock of \$25,000 to manufacture work jigs, tools and special machinery of various kinds. The principal stockholders are William F. Turner, W. C. Moore and J. H. James.

The Johnson Bearing Company, with a capital stock of \$100,000, has been organized by Charles O. Johnson and Hugh T. Wilson. The company will manufacture and deal in bearings, auto parts, engines and dynamos.

The Ideal Furnace Company has merged its plant with the new combine of heating and ventilating companies, to be known as the Federal Heating Company. The capital stock of the new company is \$8,200,000.

The Federal Light & Power Company has been organized by Frank E. Robson, Angus Smith and Henry W. Dakin, with a capital stock of \$100,000. The new company will generate and deal in electrical current.

A new industry of minor importance is the United States Motor Castings Company, which has been incorporated with a capital stock of \$5,000 to manufacture the smaller automobile castings.

The W. A. Paterson Company, Flint, Mich., a large manufacturer of carriages, has increased its capital stock from \$200,000 to \$330,000.

A new company has been organized at Port Huron, Mich., under the style of the Brennen Furniture Company, with a capital stock of \$25,000. No manufacturing plans have been given out.

The rapidly increasing business of the Grand Ledge Paint Company, Grand Ledge, Mich., has necessitated the erection of an addition to its present factory. The new building will be of cement brick, 44 x 52 ft.

The Vogt-Schmidt Company, with a capital stock of \$25,000, has been organized at Saginaw, Mich., to carry on a general packing business. The construction of the necessary buildings and the installation of equipment will be rushed, it is said.

Harrison, Mich., has bonded itself to the amount of \$8,000 for the purpose of extending and improving its electric light and waterworks systems.

The taxpayers of the school district of Dowagiac, Mich., will vote this month on a proposition to bond for \$6,000 for a new central heating plant.

The electric lighting, street railway and water works plants of Ironwood, Mich., have been purchased by the Gogebic & Iron Counties Railways Light Company. The new company promises to extend and improve the lighting plant and street railway.

S. B. Monroe, Fred M. Hodge and James S. Dewing, of Kalamazoo, Mich., are reported to be interested in the organization of a paper company which will erect a large mill at Kalamazoo. The company will have a capital stock of \$150,000.

The City Council of Saginaw, Mich., has voted to ask for bids for two new pumps for the west side pumping station. Duplex compound pumps with a rated capacity of 3,000,000 gal. each 24 hours are desired. The city is also contemplating the construction of a new lift bridge across the Saginaw River.

Fire, which caused a loss of \$45,000, totally destroyed the large grain elevator of McLane, Swift & Co., at Battle Creek, Mich. It is expected that the burned structure will be immediately replaced.

A new company is in process of organization at Charlotte, Mich., to be known as the Charlotte Carburetor Company. R. Crofoot and M. K. Miller are president and manager respectively of the company. The new concern will manufacture a patent carburetor and it is planned to erect a good-sized building.

The Lewis Spring & Axle Company, Jackson, Mich., is erecting a new plant, 250 x 250 ft., one story, of brick construction, at a cost of \$60,000. The company, which manufactures axles, gears, controls and other automobile accessories, will thereby increase its capacity about one-third.

Cincinnati

CINCINNATI, OHIO, July 11, 1911.

There is no material change in the general situation, though there is a continued slight improvement in the machine tool inquiry. A number of tool builders and other manufacturers followed their usual custom of shutting down the first week in July for repairs, and this cessation of activities was doubly welcomed by both employers and employees, due to the intense heat that has prevailed in the Middle West lately. Several foundries report a small increase in their melt, at the beginning of the present week, but taking them as a whole, they are operating to barely 60 per cent. of capacity.

Dealers in second-hand machinery are doing moderately well. There is a reported slackening in the demand for machinery and engineering supplies, and dealers in building materials are also making some complaint. On the other hand, the railroads are reported as having issued more requisitions for small shop supplies than for some time past.

The National Society for the Promotion of Industrial Education will hold its next annual convention in

THE MACHINERY MARKETS

Cincinnati, November 2, 3 and 4. F. A. Geier, president of the Cincinnati Milling Machine Company, and vice-president of the society, is making preliminary arrangements for entertaining the visiting delegates.

The Kentucky Lumber Company, First National Bank Building, Cincinnati, will soon be in the market for four miles of standard section rails, logging cars and a Shay locomotive, for delivery near LaFollette, Tenn.

The Brackett Bridge Company, whose sales offices are in the First National Bank Building, Cincinnati, has leased a building at Fifth and Toledo streets, which will be fitted up for fabricating structural material, bridges, fire escapes, etc. Only part of the necessary equipment has yet been provided for.

Reports as to the fire damage sustained by the Swing Electric Company, Cincinnati, have been exaggerated. The office was practically destroyed, but the plant is intact, and no delay will be experienced in filling orders.

The foundry of the Peck-Williamson Heating & Ventilating Company, at Oakley, Ohio, will soon be enlarged. This company recently merged with the Federal Heater Company, and it is proposed to make the Oakley plant one of the largest of its kind in the country.

The Norwalk Drilling Tool Company, Norwalk, Ohio, has increased its capital stock from \$10,000 to \$20,000. It has not yet been announced if any additions to present facilities are planned.

The Eagle Woodenware Mfg. Company, Circleville, Ohio, has awarded the contract for the construction of a factory at Hamilton, Ohio. The main building will be 50 x 160 ft., workshop 50 x 130 ft., and boiler room 33 x 34 ft., all one story and of regular mill construction. In addition there will be a number of dry kilns.

George Barkman, architect, Hamilton, Ohio, is drawing up plans for a heating system for the Hamilton Infirmary, to cost about \$15,000. The present system is said to be inadequate for the institution's needs.

The Hanna Paint Company, Columbus, Ohio, has acquired a site at Water and Long streets, on which it proposes to erect a large paint factory structure within the next 12 months.

The South

LOUISVILLE, KY., July 11, 1911.

Dull conditions have been relieved by a fair number of inquiries, but actual sales have been light and prospects are not particularly good. It is hoped that, now that the railroads have started on new fiscal years, in many cases they will be more active buyers. As it is they have been purchasing little or nothing beyond absolute necessities.

The Alvey-Ferguson Company, Louisville, which is erecting a plant at Oakley, near Cincinnati, has announced that it will not abandon the Louisville plant, but will continue it in operation. Morris U. Bernheim, president of the company, said that the new factory would be completed and put in operation in August. All the machinery for it has been purchased, he said. The company manufactures conveying machinery.

A report from Clarksville, Tenn., is that the foundry and machine shops which were conducted by the Red River Furnace Company will be reorganized under the name of the Clarksville Machine & Foundry Works. Louisville stockholders of the company said that certain changes are contemplated, but that they have not yet been definitely decided upon.

The General Council of Louisville has formally approved plans for the construction of the new hospital plant, which will cost between \$800,000 and \$900,000. D. X. Murphy & Bro., Louisville, the architects, have announced that bids will be asked for late in August. There will be a large tonnage of reinforcing bars required, as most of the buildings will be of reinforced concrete. The plant will produce its own power, but details as to the capacity of the power house, etc., have not yet been worked out.

Jacob Greenburg and others have purchased the Galt House in Louisville and will make many improvements. An entirely new power plant is to be installed and two new elevators will be provided. The new owners, who have organized the Louisville Galt House Company, plan to spend in the neighborhood of \$50,000.

The Kentucky Electric Company, of Louisville, has let a contract to the Kennicott Company, of Chicago, for the erection of a steel stack at its new power house. It is 205 ft. high and 13 ft. in diameter.

Louis B. Glass, of the Pearl Laundry, Louisville, is

planning the construction of a new power plant. He will be in the market shortly for a 50-hp. boiler.

The Standard Laundry, Eleventh and Main streets, Louisville, is considering the erection of a new plant and will be in the market for power and special equipment.

The Long Towel Supply Company, Louisville, is installing some new equipment. Contracts for special machinery have been let to the American Laundry Machine Company, Cincinnati, and the Troy Machine Company, Troy, N. Y.

The Coil Coal Company, which is planning the operation of a mine near Madisonville, Ky., is erecting a power house and tippie. Mining machinery is to be installed at once.

The Rotary Hoisting Engine Company of America has filed articles of incorporation at Owensboro, Ky., giving its capital stock as \$100,000. The incorporators are Hugh Roy, Guy G. and James W. Gilbert. The object of the company is to manufacture the hoisting type of Moore rotary engine, which was patented in May, 1910.

The quarters of the Isbell-Chapman Electric Company, Bowling Green, Ky., dealer in electric apparatus, were burned July 5 entailing a loss of \$4,000, partially insured.

The Brush Creek Mining & Mfg. Company, Barbourville, Ky., is planning the installation of a compressed air plant and other equipment during the next few months. The improvements will aggregate \$40,000, it is reported.

The Anglo-American Milling Company, Owensboro, Ky., has taken over the plant of the Hoagland Buggy Company in that city and is planning to equip it for the manufacture of Midget flour mills. The mills have been made on a small scale heretofore by the Kentucky Electric Company, Owensboro, but the new concern will have an annual production of 350. Fifty men will be employed in the new plant.

It is reported that the distilling plant of G. & B. Burdes, Cincinnati, Ohio, which is located at Nicholasville, Ky., is to be reconstructed, a new power plant being among the improvements contemplated. Details regarding the work are not available.

Boston capitalists, it is stated, are planning the erection of a power plant on Dix River, near Danville, Ky., for the purpose of furnishing light and power to the surrounding cities of Danville, Harrodsburg, Richmond, Stanford and Lancaster. A dam of concrete and steel will be built, according to the report, and a hydro-electric power plant will be constructed, the total amount it is planned to expend being \$1,250,000.

The Murfreesboro, Tenn., Water Works Company has been purchased by J. R. Jetton and Henry King. They plan considerable improvements in the property.

The Lookout Boiler Works, Chattanooga, Tenn., has been awarded the contract for the erection of a water tower and the installation of mains for a tuberculosis sanatorium at Chattanooga.

The Chattanooga Railway Company, Chattanooga, Tenn., is erecting a new power house for the operation of cars up the incline to Lookout Mountain.

The Knoxville Board of Trade, Knoxville, Tenn., is negotiating with the French Bread Mfg. Company, Barnard, N. C., relative to the removal of the handle plant of the company to Knoxville. It is stated that there is a strong probability that this will be done.

Business men of Knoxville, Tenn., have organized a traffic bureau for the purpose of handling freight matters in their interest. Among the members of the bureau are the Southern Pipe & Foundry Company, Ty-Sa-Man Machine Company, Knoxville Foundry & Machine Company, Knoxville Iron Company, Fair Foundry Company and Sanford-Day Iron Works.

The Southern Sash & Door Company, Montgomery, Ala., part of whose plant was destroyed by fire recently, will rebuild the damaged portion at once.

The Cotton Belt Lumber Company, Bearden, Ark., is making plans for the reconstruction of its saw and planing mills, which were recently burned.

A band mill is to be erected at Richardson, Miss., by the A. G. Little Lumber Company.

The W. A. Rowe Vehicle & Machinery Company has filed articles of incorporation at Ft. Smith, Ark. It has \$10,000 capital stock. Among those interested are M. A. Rowe and J. V. Hinckley.

The Morgan County Cotton Compress & Warehouse Company is being organized with \$25,000 capital stock at Decatur, Ala., by Robert G. Cortner, H. B. Bynum and others. A compress with a capacity of 1,000 bales a day will be erected.

THE MACHINERY MARKETS

For the purpose of establishing a water works system the municipality of Kentwood, La., is contemplating the issue of \$50,000 of bonds.

The Southern Hay Press Mfg. Company, Silver Creek, Miss., is contemplating removal to Hattiesburg, Miss. M. L. Bixler, secretary of the Hattiesburg Commercial Club, is in communication with the company.

Dothan, Ala., is to hold an election in the near future to decide the question of issuing \$75,000 of bonds for the purpose of erecting electric light and water plants.

The Eagle Aeroplane Company has been organized at Brunswick, Ga., with \$100,000 capital stock by John M. Biggs, Percy B. Morris and C. A. Lincoln. The company plans to begin manufacture in the near future.

The commissary department of the Sloss-Sheffield Steel & Iron Works at Bessemer, Ala., was burned recently with a loss of \$10,000.

The Noiseless Wheel & Truck Company, Cedartown, Ga., has taken over the plant of the Cedartown Iron Company, which includes machine shops and foundry and wood working departments, and will operate it for the manufacture of a patented truck and the noiseless wheel. An additional building is to be erected. Philadelphia men are interested in the company.

The city of Sentinel, Okla., will let contracts shortly for equipment for an electric light plant, including engine boiler, generator, etc.

The power plant of the Athens Electric Railway, Athens, Ga., at Mitchell's Bridge, is being increased to 1000 hp. Another power plant which the company operates is to be enlarged also.

George C. Brown & Co., Memphis, Tenn., will erect a band sawmill in Arkansas.

St. Louis

ST. LOUIS, MO., July 8, 1911.

The past week has been a quiet one in the machine tool market, though dealers report a generally better feeling and some slight gain in business. There have, however, been no lists of consequence out and none of this character, it is believed, can be expected until the turn to fall business develops. A conservative statement is that the machine tool dealers are doing about 60 per cent. of a normal business. This, however, is better than for the greater part of the past six months and is encouraging to dealers. The business, however, for this district depends to a measurable extent on the money coming out of the crops, and until the recent hot spell and its effect have been discounted it is not likely that there will be any very active inquiry in this market.

The Fulton Iron Works has about closed for its crane system for its new plant on the western edge of the city and announcement of the award of the contract, which amounts to about \$25,000, is expected shortly. The other new equipment for the plant will not be settled on until later.

The city of St. Louis the past week awarded to the Dravo-Doyle Company, Pittsburgh, Pa., a contract for two turbine pumps for the waterworks of 40,000,000 gal. daily capacity. The figure was \$54,950. The Myers Construction Company, St. Louis, will build a new intake tower gate for \$9,250.

The St. Louis Independent Packing Company has completed arrangements to build a three-story addition to its refrigerator building and will increase refrigerating machine capacity.

The National Plumbing & General Supply Company has been incorporated in St. Louis with \$100,000 capital stock to take over the bankrupt business of the National Plumbing Company. It will modify the present equipment of the old company and will operate a lead pipe manufacturing plant in East St. Louis. The officers are George H. Robinson, president; Fred G. Turner, vice-president; Robert W. Moore, secretary; Valle Reyburn, treasurer.

The Pyrite Mining Company, with \$25,000 capital stock, has been incorporated in St. Louis by G. W. Hess, J. S. McIlvaney and Le Roy Baker, to operate a mine in southeast Missouri. They will purchase new equipment.

The Kimball-Sawyer Milling Company, Kansas City, Mo., has been incorporated with \$50,000 capital stock by George I. Kimball, M. J. Harrington and H. A. Sawyer and will equip a plant at once.

The Springfield Drain Tile Company, Springfield, Ill., has been incorporated with \$30,000 capital stock by Joseph A. Long, C. G. McIntosh and John F. Miller and will install equipment for the manufacture of tile products.

The upper works of the Wilharm mine at Belleville, Ill., owned by the St. Louis & O'Fallon Coal Company, were destroyed by fire the past week with \$10,000 loss, requiring the purchase of new hoisting equipment.

The Imperial Clock Company will build a two-story factory building, 40 x 110 ft., and equip it for the manufacture of clocks. The location is 3419 Rutger street, St. Louis.

The Moon-Hopkins Billing Machine Company has leased a new six-story factory building at Twenty-second and O'Fallon streets, St. Louis, and will equip it at once for the manufacture of its product. This is an increase in its capacity. The company has a capital stock of \$2,500,000.

The machine shop, erecting shop and offices of the Lennox Machine Company, at Marshalltown, Iowa, were destroyed by fire, June 25, entailing a loss of \$125,000. The records of the company were saved, as was also a considerable stock of unassembled parts. It will be possible to proceed with the business of the company therefore without interruption. Temporary manufacturing facilities are to be arranged at once pending the completion of plans for a new plant. The location of the new plant has not been decided further than that it is not planned to rebuild at Marshalltown. The Lennox Machine Company is owned by Joseph T. Ryerson & Sons, and the officers are Clyde M. Carr, president; E. T. Hendee, vice-president; W. A. Morey, secretary and treasurer.

Eastern Canada

TORONTO, ONT., July 8, 1911.

The extreme heat has greatly retarded operations in the manufacturing industries. In all works and all over the country there has been a decided slowing down because of the heat, men being unable to keep up their accustomed exertions. To some extent, too, the weather has affected the demand. The fruit prospects of the Niagara district and other sections of Ontario have been much changed for the worse by the extremely high temperatures of the last week and by the lack of rain. Millions of dollars have been taken off the value of Ontario's fruit expectancy this year as a consequence of the unfavorable weather. Ontario's meadows, which are a very great source of wealth, have been made much less productive by the drought. The hay crop of the province will be relatively short and the dairy output much lessened. These changes in the outlook have not been without effect on the spirits of business men, though the very promising grain harvest seems to assure an exceptionally good year to the agriculturists. British capital continues to flow in, Western municipalities alone having floated debentures in the first half of the year amounting to upward of \$64,000,000. There is a strong probability that the Dominion elections will be held this fall unless the government succeeds in having closure rules adopted early in the reopening of the session less than two weeks hence, for the opposition will otherwise hold up supply if the government persists in pushing the reciprocity bill through without consulting the people. A general election would be somewhat unsettling to business, but it is certain the campaign would not be protracted.

D. Lorne McGibbon's scheme to produce hydroelectric power at the Cedar Rapids, near Montreal, contemplates a development of 100,000 hp. It is said that \$600,000 has been expended in the purchase of the rights.

The Electrical Distributing Company of Ontario, which has arranged to deliver power in Windsor, Ont., and in Detroit, Mich., expects to be making delivery 12 months hence. It has a capital stock of \$2,500,000. It is under contract to take from 15,000 to 30,000 hp. from Niagara Falls.

The ratepayers of Windsor, Ont., are to vote on three money by-laws on July 24. One is to raise \$50,000 to lay a new intake pipe in the Detroit River, another is to raise \$178,550 to spend on fire equipment, most of the money to be laid out on motor fire trucks. The third is to exempt the National Spring & Wire Company from taxation and give it a free supply of water, the company undertaking to put up and operate a plant of considerable capacity.

The Garton Pew Fisheries Company, Gloucester, Mass., proposes to establish a plant, to cost from \$40,000 to \$50,000, at Louisbourg, N. S., on condition that certain local privileges be granted.

The Canadian Flour Mills, Chatham and Blenheim, Ont.; Taylor Milling Company, Chatham, Ont.; Hessel Bros., Milverton and Listowel, Ont.; Tavistock Milling

THE MACHINERY MARKETS

Company, Tavistock, Ont.; James Goldie Company, Guelph, Ont.; McLeod Milling Company, Stratford, Ont.; Carter Milling Company, St. Mary's, Ont., and John Campbell Company, St. Thomas, Ont., are joining in a new flour mill merger.

The Colonial Engineering Company, Montreal, is seeking franchises from Ontario towns for street railroads, water works and interurban electric lines.

The Dominion Corset Company, Quebec, has purchased a large site at Maisonneuve, Montreal, on which to erect a factory. Seven hundred hands are to be employed at the outset and an additional 500 in the near future.

The Canadian Steel Foundry Company, Welland, Ont., expects to increase its present strength of 500 men to 750 men.

The Montreal Water & Power Company expects to have its big filtration plant completed a year from the present. It intends to install a new 10,000,000-gal. pump within the next twelvemonth and will increase its main trunk system by the addition of about three miles of 4-ft., 3-ft., 30-in. and 16-in. steel and iron mains.

The Railway Department of the Dominion Government is about to place orders for 12 locomotives, 12 passenger coaches, 3 diners, 3 express and postal cars and 500 freight cars for the Intercolonial Railway.

It is rumored in Ottawa that the contract for the Dominion Government's naval vessels has been awarded to the newly formed British-Canadian Shipbuilding & Dry Dock Company, whose headquarters are to be at Sydney, N. S. Sir Henry Pellatt, Toronto; Mr. Gibson, Lieutenant-Governor of Ontario, and Sir Charles Ellis, chairman of the John Brown Company, Clyde Bank, Scotland, the company that built the Lusitania and the Mauretania, are directors of the British-Canadian Shipbuilding & Dry Dock Company.

The Ford Motor Company of Canada, Walkerville, Ont., is about to enlarge its factory to almost double its present capacity.

It is stated that D. A. Gordon, M. P., will build a sugar refinery at Chatham, Ont.

R. Scott & Son, wheel manufacturers, and Canadian Motors, Ltd., have purchased five acres of land each from the Parks Commission in Galt, Ont., on which they will at once build modern plants.

Work has been commenced on a new boiler house at the Allen shafts colliery of the Dominion Coal Company at Stellarton, N. S. The equipment is to consist of six B. & W. boilers of 3000 hp., to which are to be added six others of the same capacity. The company's building for electrical power purposes will soon be completed. It will be one of the largest in the province.

The City Engineer of Toronto has been instructed by the Board of Control to proceed at once with the construction of the municipal street railroad lines authorized by the ratepayers. The outlay on construction plant, rails, poles, wires and other equipment, exclusive of rolling stock, will amount to \$213,529.

All employees of the Angus shops, Montreal, have been granted increases by the Canadian Pacific Railway directors.

The Vickers-Maxim floating dock for Montreal is to be built at the firm's works in England and will be towed across the Atlantic. It will lift 25,000 tons and will have a length of 950 ft.

Carsley & Co., bankers and brokers, Montreal, are moving in the interest of certain capitalists to build a \$300,000 hotel in Kingston, Ont.

A by-law is to be submitted to the ratepayers of Hamilton, Ont., July 25 to raise \$500,000 for a local distribution plant to be operated in connection with the Hydro-Electric Commission's system.

The government of New Brunswick and the City Council of St. John are considering proposals for the establishment of a steel shipbuilding industry in that city.

The United States & Canada Sulky Company, promoted by manufacturers from Marion, Ohio, will start operations shortly in Stratford, Ont.

The Positive Clutch & Pulley Works, Aurora, Ont., is erecting a factory.

The Niagara Brand Spray Company is negotiating with the town of Brighton, Ont., to establish a factory there.

The Massé-Harris Company is calling for tenders to erect a factory warehouse at its works in Brantford, Ont.

The Standard Underground Cable Company, Pittsburgh, is having plans prepared for a factory to cost \$400,000, to be built in Hamilton, Ont. The name of

the company was incorrectly given recently in this correspondence.

The Montreal Locomotive Works has had plans prepared for a factory at Long Point, Montreal.

Western Canada

WINNIPEG, MAN., July 8, 1911.

Harvest prospects continue excellent in the Canadian West. The great question is will there be hands enough to take the crop off? Sir William Whyte, who holds sway for the Canadian Pacific Railway Company in that part of the country, says that 162,000 men will be required for the harvest and of this number about 50,000 will have to be drawn from outside sources. The financing of the crop movement may not be effected without disturbance to manufacturers, as the volume of currency is not much greater now than it was a year ago when a crop of not more than half the magnitude of the present one had to be handled. Basic conditions are, however, all that could be desired and current business is excellent.

Equipment is required for the extension of water works for Medicine Hat, Alberta. Pumps, boilers, pipe, etc., will be needed.

The contract for building the Canadian Northern Railway section between Hope and Camloops at a cost of \$15,000,000 has been awarded to the Northern Construction Company.

George F. Brown, of the Farmers' Metal Granary Company, Winnipeg, is endeavoring to organize a company to start a branch factory in Regina, Sask.

The City Commissioners, of Edmonton, Alberta, have awarded the contract for the steel work of the east end bridge to the Dixon Bridge Company.

The Starr & Reed Company, Philadelphia, has asked to be allowed to compete for the establishment of a gas plant in Edmonton, Alberta.

The new Calgary Nail Works, Calgary, Alberta, is endeavoring to get coöperation of the local Board of Trade to bring about a reduction of freight rates on raw materials coming into the city.

It is stated that if the reciprocity agreement is established the Quaker Oats Mfg. Company and the Nelson Morris Company, both of Chicago, will at once establish large manufacturing plants in Calgary, Alberta.

The Electric Light Company, Brandon, Man., is spending about \$100,000 on additions to plant and new equipment. A 2250-hp. engine will be installed by the Goldie McCullough Company, Galt, Ont., and in conjunction therewith there will be a new generator and 15 new boilers.

The Powell River Paper Company at Powell River, B. C., which is about 80 miles up the coast from Vancouver, will begin manufacturing operations about the middle of next month. Its plant has cost about \$2,500,000.

The Pacific Coast

SAN FRANCISCO, CAL., July 5, 1911.

The movement of machine tools is slowly increasing in volume, and, while the majority of orders are for one or two machines of rather insignificant size, inquiries for heavy tools are much more numerous than earlier in the year. More activity is noted through the country than in San Francisco owing to improvements to small shops. Increasing activity is noted in electrical equipment of all descriptions. A number of rather important hydroelectric plants are either under construction or in contemplation for the near future, and the use of electric power is gaining ground both for large manufacturing plants and agricultural uses. The export trade to the Orient continues active, machinery forming an important part of the cargo of nearly every steamer. The farm implement trade has developed most rapidly, but considerable electrical and mill equipment is also being shipped. The demand for sawmill and wood-working machinery is well sustained, and notwithstanding general complaint in the lumber industry plans are being developed for a number of new mills. A few old plants are also increasing their capacity, though the majority of the business consists of necessary replacements. Mining and dredging machinery is still receiving considerable attention, though little additional business is expected from Alaska this season. Shipbuilding plants along the coast are well occupied and there is a steady demand for marine gas engines. Engines of coast manufacture have the preference for this purpose.

THE MACHINERY MARKETS

The demand for mining machinery has been very active for the last few weeks. Orders for large outfits have not been much in evidence, but air compressors, pumps and hoisting machinery are being shipped in considerable quantities to all the mining districts in California, as well as to Nevada. The Western Pacific Railroad is carrying a heavy tonnage of mining, logging and sawmill equipment, both from San Francisco and from eastern points to the Plumas County district, which has formerly been handicapped by lack of transportation. Buyers in the oil fields are also coming into the market more freely than for some time past.

Considerable encouragement is taken from the fact that the Union Iron Works Company, controlled by the Bethlehem interests, is materially increasing its investment in San Francisco. The company has let a contract to the Pacific Rolling Mill Company for a new steel building, the upper floor of which is to be used as a laying-out room for marine work, and another steel building is to be erected in the near future. The additions will include a new copper shop and plate shop.

The Columbia Steel Company has installed a wireless telegraph outfit for direct communication between its San Francisco offices at Market and First streets and the plant near Antioch, Cal., a distance of about 36 miles in a direct line. This company has just produced a steel casting said to be the first of the kind ever turned out on the Pacific Coast, consisting of a stern post and rudder frame for the steamer Watson. It is 26 ft. high, 14 ft. wide, with a maximum thickness of about 12 in., weighing 11,300 lbs.

The steel foundry of the C. L. Best Gas Traction Company, Oakland, Cal., is getting a considerable volume of outside work and has recently made some large castings for the Standard American Dredging Company.

The city of Albuquerque, N. M., will receive bids July 8 for a pumping plant of 300 gal. per minute capacity against a 360-ft. head, 8 miles of water mains and a 150,000-gal. steel tank and tower.

The Pacific Electric Railway Company expects to start work shortly on its new car shops at Los Angeles.

Los Angeles County has just received bids for two steam road rollers.

R. A. Baker & Co. are planning to install a new rock crusher at their quarry, South Pasadena, Cal.

The city of Los Angeles is taking bids on a centrifugal pump with 100-hp. electric motor.

Los Angeles County will receive bids August 31 for two engine generator sets for the Hall of Records building.

The city of Pasadena, Cal., has ordered a new unit for the municipal light plant, amounting to about \$22,000.

The Great Western Power Company is starting operations on its new plant at Big Meadows, Cal., which will require the installation of a lot of heavy machinery. In connection with the dam construction two impulse wheels with an aggregate capacity of 1500 hp., with Pelton oil pressure governors, have been purchased from the Pelton Water Wheel Company. The Great Western Power Company is also planning a material increase in its Big Bend plant and is expected to be in the market for machinery in the near future.

The Western Water Company, serving the west side oil fields in Kern County, Cal., has placed orders for two 250-hp. pumping plants.

The Tulare Power Company, Tulare, Cal., expects to start work on a large hydroelectric plant about the end of summer. Plans are also being made for a number of substations and auxiliary steam plants.

The Nevada Power & Transportation Company, Reno, Nev., expects to begin work shortly on a 4000-hp. hydroelectric plant on Truckee River.

N. E. Otterson, representing the Chicago Pneumatic Tool Company, has received numerous orders from the oil fields recently. One compressor of 150 cu. ft. per minute capacity has been shipped to the Midway field, to be used in the construction of steel tanks.

The Yosemite Lumber Company announces that it will commence work on its new mill at Merced Falls, near Merced, Cal., in about a month.

The Olson & Mahony Lumber Company, San Francisco, will let contracts shortly for a 225-ft. steel steamer with a triple expansion engine and two Scotch boilers.

The Pacific Gas & Electric Company is preparing to install a 5000-kw. steam turbine generator at or near San Rafael, Cal.

The Hihn-Hammond Lumber Company is installing a lot of sawmill machinery at Watsonville, Cal.

W. L. Dunn and the Oxnard Mfg. Co. Garage & Machine Company, Oxnard, Cal., have consolidated as the

Dunn Mfg. Company with a capital stock of \$150,000. The principal stockholders are W. L. Dunn, J. A. Drifill, H. R. Staples, G. C. Robbins and H. E. Thomas. Some new equipment is being purchased.

Philip H. Silverman, of the San Francisco Iron & Metal Company, scrap dealer, will be in Philadelphia about the middle of the month.

The Pomona Mfg. Company, Pomona, Cal., manufacturing pumps, traction engines, etc., is planning to enlarge its plant.

The Pacific Basket & Barrel Company, San Francisco, is installing two new planers, two motors and a large Mershon band resaw.

George Real is starting a small machine shop at Sacramento, Cal.

The Natomas Consolidated Mining Company, of California, has placed an order with the Yuba Construction Company, Marysville, Cal., for the construction of a new gold dredge at a cost of about \$275,000.

The A. L. Young Machinery Company, San Francisco, has sold a 12-ton steam roller to the city of Oakland.

The Spring Valley Water Company is taking figures on a pumping station to be erected at Lake Merced, San Francisco.

San Joaquin County, Cal., has just received bids for a 12-ton gasoline road roller.

The West Tacoma Steel Company has been incorporated at Tacoma, Wash., with a capital stock of \$500,000 by M. E. Gunston, W. R. Flaskett and R. W. Taylor.

The Washington Steel & Iron Company, Spokane, Wash., is considering plans for a new steel plant at Leavenworth, Wash.

The Hoquiam, Wash., Steam Boiler Works is preparing to install a shop in that city.

It is reported that a manufacturer of harvesting machinery of Minneapolis, Minn., is considering the installation of a branch factory at Astoria, Ore.

The Standard Oil interests are completing plans for one of the largest oil distributing plants on the Coast to be installed at Richmond Beach, on Puget Sound. Large storage tanks will be erected both for fuel oil and refined products.

The L. T. Eyer Gravel Company, Seattle, Wash., has a 15-year contract for working gravel beds at Irondale, Wash., and a lot of machinery will be required for handling the material.

Dearing, Gordon & Co., J. R. Crawford and others, of Vancouver, B. C., have secured mining rights on Siwash Creek. A power plant, flume and hydraulic outfit will be installed.

It is reported that the Washington Water Power Company will expend about \$4,000,000 on its new power plant at Long Lake, near Connell, Wash.

Arrangements are being made for the immediate replacement of the power plant of the Portland Railway, Light & Power Company at Vancouver, Wash., which was destroyed by fire early this month.

The O'Connell Lumber Company, Winlock, Wash., will erect a new mill to replace that which was burned May 18.

The Richardson shingle mill, Olympia, Wash., which was burned recently, will be replaced shortly.

The Monroe Shoe Mfg. Company, Monroe, Wash., has leased a large building at that place and will install a factory with a daily capacity of 100 pairs.

It is announced at Valdez, Alaska, that California interests will install a gold dredge on Slate Creek near that place next summer.

The Morgan-Stansbie Company, Eugene, Ore., has increased its capital stock and is preparing to make extensive additions to its planing mill.

It is reported that the Great Northern Railway will put in a large car shop near Everett, Wash.

The Skagit Commission Company, Sedro-Woolley, Wash., is preparing to install a feed mill.

The Shultz Belting Company, St. Louis, Mo., has opened an office at Tacoma, Wash., with Chas. E. Grigg as sales manager.

The California Eucalyptus Lumber Company, Los Angeles, has placed an order for a complete saw and planing mill outfit with C. W. Willette, Seattle, Wash., representing the Phoenix Mfg. Company.

It is reported that the Monasha Woodenware Company will install a new plant at North Bend, Ore.

The Fidalgo Island Clay Works Company, Anacortes, Wash., is preparing to install a factory at an estimated expenditure of \$125,000.

The Bend Company, Bend, Ore., is planning to increase the capacity of its electric lighting plant and sawmill.

THE MACHINERY MARKETS

The Seattle Car Mfg. Company has completed plans for a steel building for a forge and machine shop at Renton, Wash.

The Loggers' & Contractors' Machinery Company, recently incorporated in this city, has opened an office at Seattle, Wash., under the management of G. L. Davis.

The Columbia Box & Veneer Company is starting work on a large plant at Puyallup, Wash.

The Crown Pulp & Paper Company, Oregon City, Ore., has placed an order for a lot of large pulp digesters with the Portland Oxyacetylene Company, of this city.

A representative of the Berlin Machine Works, Beloit, Wis., has been in Portland, Ore., for some time to complete arrangements for the establishment of the proposed branch shops. While the precise location and proposed equipment of the plant have not been announced, its establishment is assured and the installation will amount to about \$750,000.

A complete logging camp outfit has just been shipped to Wrangell, Alaska, for the McDonald & West Lumber Company.

Texas

AUSTIN, TEXAS, July 8, 1911.

Good rains covering a big part of the cotton belt of Texas have improved business conditions the past week. An increase of activity in general building operations and a growing demand for machinery are noted. Several irrigation projects of great magnitude are being promoted and each of them will require much machinery in their fulfillment. Industrial conditions in Mexico are gradually improving and many orders for mining and other machinery are now being placed in the United States.

D. B. Chapin, who is promoting the construction of a large dam across Devil's River and the establishment of a system of irrigation that will reclaim more than 100,000 acres of desert land in the vicinity of Del Rio, announces that a syndicate of New York men have agreed to finance the project, provided certain stipulations are complied with in the matter of securing the necessary lands. Mr. Chapin has obtained options on 90,000 acres of land and says that he will close contracts for 30,000 more acres. His plans also embrace the installation of a large hydroelectric plant and the construction of power transmission lines to a number of towns in west Texas. A number of industrial plants, among them being a cotton mill, are proposed in connection with the project.

The American Rio Grande Land & Irrigation Company, Mercedes, is enlarging its irrigation system in that section. Contracts have been let for the construction of three additional miles of main canal and about 35 miles of laterals at a cost of about \$100,000. The work involves the construction of a concrete flume one-quarter of a mile long across Campacus Lake. The extensions that are now being made will bring 6000 acres of additional land under irrigation.

The Commissioners' Court, of Hidalgo County, has acted favorably on a petition of citizens for the formation of the Llamo Grande Improvement District for the purpose of issuing bonds to the amount of \$125,000 to drain 90,000 acres of land in the vicinity of Donna and Mercedes. George B. Merriweather, of Donna, was appointed engineer to make a report upon the feasibility and cost of the proposed drainage system. The plans contemplate the dredging of a channel through the lands by which the flood waters will be given a free outlet to the sea.

The City Council of Sherman has ordered the purchase of pumps, engines and compressors for the municipal water works plant to cost about \$25,000.

The Board of Water Commissioners of Waco has been petitioned by local taxpayers to arrange for a bond issue of \$350,000 to construct a water storage reservoir and install a water works plant and distributing system with a capacity of supplying a population of 100,000 people. The proposition seems to be meeting with general favor and it is believed that it will be carried out.

H. M. Smith, Ft. Worth, will erect a grain elevator with a capacity of 12,500 bu. at Brownsville.

The San Antonio Machine & Supply Company will install a large plant at San Antonio for the manufacture and repair of gasoline engines.

The City Council of Yoakum is arranging to let the contract for the installation of a garbage crematory to cost about \$2,500.

The Alamogordo Improvement Company, Alamogordo, N. M., is installing a canning factory, which will have a capacity of 5,000 cans per day.

William Palmer, Jr., Las Cruces, and associates will erect a large flour mill at Rincon, N. M.

The Hydroelectric Mining Company will construct an extensive system of irrigation in the Sulphur Springs Valley, near Tombstone, Ariz., where it has taken up considerable land under the desert land act.

Andrew Mackenzie, of Mexico City, has been granted a concession by the government of the State of Hidalgo for the installation of a large hydroelectric plant and the construction of transmission lines to run to the Zimapam, Mexico, mining district and other industrial centers of the State of Hidalgo. The concession authorizes him to use the waters of the Moctezuma and Tula rivers for the generating of the electric power.

The Waxahachie Gas Company has been organized with a capital stock of \$125,000—\$64,900 paid in—to build a modern water gas plant at Waxahachie within one year.

The Temple Gas Light Company, Temple, will build a water gas plant in that city within the next six months. The company has been organized with a capital stock of \$150,000, of which \$80,000 has been paid in.

J. C. Wilson is arranging to build a factory at Crockett for the manufacture of pressed brick. Considerable machinery will be required for the proposed plant.

The City Council of Amarillo contemplates issuing \$15,000 of bonds for extending the municipal sewer system.

The Greer Filter Mfg. Company, Pittsburgh, Pa., has the contract for installing a water filtering plant for Brownsville. The plans call for a plant with a capacity of filtering 1,000,000 gal. of water a day and so designed that it can be increased to supply 2,000,000 gal. with but little additional cost.

The Wharton County Warehouse Company is erecting a large elevator at El Camp. The building will soon be ready for the installation of machinery.

The installation of a large hydroelectric plant on the Gila River near Red Rock, N. M., is contemplated by Col. J. W. Carter, of Silver City, and associates. Engineers are making preliminary surveys with a view of locating a site for the proposed plant. Transmission lines will be built from the power station to the Mogollon mining district for supplying the energy for operating the machinery of the mines and mills. Other transmission lines will also be constructed to Silver City and a number of towns and industrial centers within a radius of about 100 miles of Red Rock.

The formal transfer of the local water works system to the city of Tucumcari, N. M., has taken place. The plant will be enlarged and otherwise improved.

J. H. Hays and Robert S. Waters will install a hydroelectric plant on Trout Creek in the eastern part of Mohave County, Ariz. The power will be transmitted to mining districts in that section and used to operate machinery of the mills.

The Oklahoma Iron Works will establish large machine shops at Tampico, Mexico.

The Huasteca Petroleum Company will construct a steel tank of 350,000 bbls. capacity for storing oil at Tampico, Mexico. This company is laying another 8-in. pipe line from its Juan Casiano oil field to Tampico, a distance of about 80 miles. It is also constructing nine steel oil storage tanks each of 55,000 bbls. capacity along the route of its pipe lines.

Albert E. Andrade, of Mexico City, will build a plant at Monterey, Mexico, for the manufacture of oleomargarine. Considerable machinery will be installed.

The Texas Company, Houston, will construct two oil storage tanks at Tampico, Mexico, each of a capacity of 55,000 bbls.

Chicago

CHICAGO, ILL., July 10, 1911.

The first week of July did not develop business at quite the rate that prevailed in June. The extreme weather conditions have undoubtedly contributed to sluggishness. At Grand Rapids, Mich., the equipment of a high school will bring into the market from \$8,000 to \$10,000 worth of machines. The Chicago & Alton Railroad is to buy a list aggregating in value from \$15,000 to \$20,000 and the American Bridge Company is in the market for approximately \$7,000 worth of tools.

J. K. Stewart, of the Stewart & Clark Company, Diversey boulevard, Chicago, is building an eight-story concrete building at 319-335 Wells street to cost \$200,000, where the company's business of manufacturing speedometers and flexible shafting will be moved.

The Scranton works of the Allis-Chalmers Company, which has been used for the building of hydraulic and sugar manufacturing machinery, is to be moved to Milwaukee, Wis. About 1000 men were nominally employed at the Scranton works, which is at Scranton, Pa.

The National Machine Company, Milwaukee, will erect a \$10,000 building at the corner of Eleventh and National avenues in that city.

The Korff Mfg. Company, Lansing, Mich., is to build an addition to its plant 80 x 120 ft. Among the new equipment that will be required will be one No. 3 punch press, one power riveter, a complete nickel and copper plating outfit and a 10-hp. motor.

The Korff Mfg. Company, Lansing, Mich., is to build a 10-stall engine house and machine shop at Virginia, Minn., and will be in the market for boiler and tool equipment. This equipment will be purchased in the office of E. Langham, Canadian Northern Railroad, Winnipeg, Manitoba.

The Denver & Rio Grande Railroad will spend \$60,000 in improvements for its shops at Salt Lake City.

Government Purchases

WASHINGTON, D. C., July 9, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids July 25, under schedule 3748, for the following foundry equipment: One core making machine, one centrifugal sand mixing machine, three pneumatic tripod sand shakers.

The Isthmian Canal Commission, Washington, will call for bids at an early date for one 500-kw., 3-phase, 35-cycle with two 200-volt turbo-generator unit with switchboard and auxiliaries complete.

The Paymaster General, Navy Department, Washington, will open bids July 25, under schedule 3720, class 1, for two single-end rapid action punches for Mare Island Navy Yard.

The Isthmian Canal Commission, Washington, will open bids July 24, under canal circular 636, for 22 spillway gates, two steel caissons, steam gates, gate valves, culvert valves, bulkhead gates and screens.

The Bureau of Yards and Docks, Navy Department, Washington, opened bids July 1 for furnishing 16 electrically driven capstans for the New York and Pearl Harbor navy yards as follows: Williamson Brothers Company, Philadelphia, Pa., \$50,255; Hyde Windlass Company, Bath, Me., \$53,290.

The Department of the Interior, Washington, opened bids July 3 for furnishing and installing ash handling machinery at the power plant and Post Office Building. Various alternate bids were received; the bids for the complete work, only, are as follows: C. H. Barker, Washington, D. C., \$7,483; Jeffries Mfg. Company, Columbus, Ohio, \$6,500; R. H. Beaumont Company, Philadelphia, Pa., \$5,317; Philips-Lang & Co., Chicago, Ill., \$8,250; Link Belt Company, Philadelphia, Pa., \$7,880; Guarantee Construction Company, New York, \$4,534.

The Albee Iron Works.—The Chester B. Albee Iron Works Company, North Side, Pittsburgh, has completed the construction of a second automatic air toggle riveter which automatically adjusts itself to any length of rivet or any thickness of work. The first machine of this kind built by the company has been in successful operation in a Pittsburgh structural iron plant for several months. In addition to automatic adjustment the machine possesses all the advantages of the pneumatic riveter, such as compressed air for operation, portability and small size and weight. It thus saves in power and secures the advantage of the hydraulic machine. Recent contracts placed with the Albee Company include the following: For the West Carson street improvements, Pittsburgh, 7000 ft. of fence in which bent 2-in. channels are used; Larimer Avenue bridge, Pittsburgh, complete railing; for the roadway along South Eighteenth street, Pittsburgh, 2000 ft. of railing, and for a fence for a traction company at Morristown, N. J., 1000 ft. The Albee Company is running to good capacity in its plant on these contracts and miscellaneous work, with indications that it will be able to continue to operate thus for some time in the future.

Mesta Shipments.—The Mesta Machine Company, Pittsburgh, with works at West Homestead, Pa., has shipped a two-stage air compressor, having a capacity of 36,000 cu. ft. per min. at 100 lb. pressure, to the Four States Coal & Coke Company, Worthington, W. Va., and has completed a four-stage compressor with a capacity of 24,000 cu. ft. per min. at 1000 lb. pressure for the same company. These compressors will be used for charging air locomotives. Shipments will shortly be made as follows: Lackawanna Steel Company, Buffalo, N. Y., a 57-in. high-speed condenser and a 12 and 34 x 16-in. dry air pump; Portsmouth Steel Company, Portsmouth, Ohio, a 72-in. high-speed condenser and a 12 and 30 x 21-in. dry air pump; Inland Steel Company, Indiana Harbor, Ind., a seven-spindle bar twisting machine; American Sheet & Tin Plate Company, Chester, W. Va., a large cut gear, 17 ft. 9 in. in diameter with 30-in. face and 88 teeth of 7¼-in. pitch and a pinion 8 ft. 9 in. in diameter with 30-in. face and 40 teeth of 7¼-in. pitch, being among the largest cut gear and pinions ever built.

The Globe Iron Company, Jackson, Ohio, advises us that an error was made in our issue of July 6 in classing Globe furnace among those blown out in June. The furnace is still running and making a large tonnage of high silicon irons, and the company has no other intention at this time than of continuing in blast. The error arose from a misunderstanding of the company's report.

The Dominion Steel Corporation's output of steel from its open-hearth furnaces at Sydney, Nova Scotia, in June amounts to 31,000 tons, which exceeds the last previous record by 3000 tons.

During the fiscal year ended June 30, 1911, 1527 vessels of 302,391 gross tons were built in the United States, compared with 1502 vessels of 347,025 gross tons for the year ended June 30, 1910. The decrease is due to a falling off of 05,000 tons on the Lakes.

The Strong Steel Foundry Company, Buffalo, N. Y., maker of open-hearth steel castings, has acquired a site of 10 acres on Elmwood and Hertel avenues, being 667 ft. deep and having 1432 ft. on the Erie Railroad. The company was organized three years ago and now occupies the buildings formerly used by the Buffalo Cement Works at Amherst and Main streets. It has lately added the manufacture of special steel castings, such as vanadium, chrome, nickel, titanium and manganese. Plans are now being prepared for fireproof buildings which will be equipped with the most modern machinery. O. H. P. Champlin is president and treasurer of the company.

Gratifying recognition of the value of their new line of heat-treating furnaces is being received daily by Tate, Jones & Co., Inc., Pittsburgh. After several years of study and experimenting their new line of tempering, annealing and case-hardening furnaces, eliminating the weaknesses of old designs and embodying some extremely valuable new principles, was brought out about three months ago, and a large number of orders is now coming in.

I. F. Lehman of the Knox Pressed & Welded Steel Company, Pittsburgh, returned last week from an extended business trip, visiting large steel manufacturers, to acquaint them with the Knox patented water-cooled doors, frames and ports for open-hearth furnaces. Various contracts were taken for such devices. The Knox Company is making the open-hearth equipment for the Keystone Furnace Construction Company. The latter's records show that Knox open-hearth devices have been in continuous service for 13 months.

The Journal of Industrial Safety for June-July has been issued. The leading article, entitled "Factory Safeguards," is by Luther D. Burlingame, chief draftsman of the Brown & Sharpe Mfg. Company, Providence, R. I. The other important articles are "A Safety Attachment for Drawing Brass," "A Safety Subway Under Massive Machinery," "A Locking Switch," "First Aid Against Producer Gas," "Safeguarding Hand-fed Rolls," "The Voluntary Compensation Plan in New York State," "Safeguarding a Motor-Driven Head Stock," "Fatal Accidents in Coal Mining" and "Central Station Welfare Work."

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Refined iron:		Nos. 22 and 24.....	lb 5.50¢	Straits pig	lb 47 @ 47 1/2¢
1 to 1 1/2 in. round and square....		No. 26.....	lb 6.00¢	Copper—	
1 1/2 to 4 in. x 3/4 to 1 in.....		No. 28.....	lb 7.00¢	Lake ingot	lb 14 @ 14 1/2¢
Rods—1/2 and 11-16 round and square.....		Corrugated Roofing—		Electrolytic	lb 13 1/2 @ 14 1/2¢
Angles:		2 1/2 in. corrugated.....		Casting	lb 13 1/2 @ 14 1/2¢
3 in. x 3/4 in. and larger.....		Painted.....		Spelter—	
3 in. x 3-16 in. and 1/2 lb.....		100 sq. ft.....		Western	lb 6 1/2 @ 7 1/2¢
1 1/2 to 2 1/2 in. x 3/4 in.....		Galvd.....		Zinc—	
1 1/2 to 2 1/2 in. x 3-16 in. and thicker.....		No. 26.....		No. 9, base, casks.....	lb 8 1/2 @ 8 1/2¢
1 to 1 1/4 in. x 3-16 in.....		No. 28.....		Lead—	
1 to 1 1/4 in. x 1/2 in.....		100 sq. ft.....		American pig	lb 5 1/2 @ 5 1/2¢
3/4 x 1/2 in.....		Tin Plates—		Bar	lb 6 1/2 @ 6 1/2¢
3/4 in. x 1/2 in.....		American Charcoal Plates (per box)		Solder—	
1/2 x 3-32 in.....		"A.A.A." charcoal:		1/2 & 1/2, guaranteed.....	lb 27 1/2 @ 28 1/2¢
Tees:		IC, 14 x 20.....		No. 1	lb 25 1/2 @ 26 1/2¢
1 in.....		IX, 14 x 20.....		Refined	lb 24 1/2 @ 24 1/2¢
1 1/4 in.....		A. charcoal:		Prices of solder indicated by private brand vary	
1 1/2 to 2 1/2 in. x 3/4 in.....		IC, 14 x 20.....		according to composition.	
1 1/2 to 2 1/2 in. x 3-16 in.....		IX, 14 x 20.....		Antimony—	
3 in. and larger.....		American Coke Plates—Bessemer—		Cookson	lb 10 @ 10 1/2¢
Beams.....		IC, 14 x 20.....		Halletts	lb 10 @ 10 1/2¢
Channels, 3 in. and larger.....		IX, 14 x 20.....		Other brands	lb 9 @ 9 1/2¢
Bands—1 1/4 to 6 x 6-16 to No. 8.....		American Terne Plates—		Bismuth—	
Burden's "H. B. & S." iron, base price.....		IC, 20 x 28 with an 8 lb. coating.....		Per lb	\$2.00 @ \$2.25
"Burden's Best" iron, base price.....		IX, 20 x 28 with an 8 lb. coating.....		Aluminum—	
Norway bars		Seamless Brass Tubes—		No. 1 aluminum (guaranteed over 90% pure), in	
Merchant Steel from Store—		List November 13, 1908.....		Ingots for remelting.....	21¢ and 22¢
Bessemer machinery.....		Brass Tubes, Iron Pipe Sizes—		Rods and Wire.....	Base price 31¢
Toe calk, tire and sleigh shoe.....		List November 13, 1908.....		Sheets	Base price 33¢
Best cast steel, base price in small lots.....		Copper Tubes—		Old Metals—	
Sheets from Store—		List November 13, 1908.....		Dealers' Purchasing Prices Paid in New York.	
Black.		Brazed Brass Tubes—		Copper, heavy and crucible.....	10.75 to 11.00 Cents.
One pass, C.R. R. G.		List February 1, 1911.....		Copper, heavy and wire.....	10.50 to 10.75
soft steel. cleaned.		High Brass Rods—		Copper, light and bottoms.....	9.50 to 9.75
No. 16.....		List February 1, 1911.....		Brass, heavy	7.25 to 7.50
No. 18 to 20.....		Roll and Sheet Brass—		Brass, light	5.75 to 6.00
No. 22 and 24.....		List February 1, 1911.....		Heavy machine composition.....	9.25 to 9.50
No. 26.....		Brass Wire—		Clean brass turnings.....	7.00 to 7.25
No. 28.....		List February 1, 1911.....		Composition turnings.....	8.00 to 8.25
Russia, Planished &c.		Copper Wire—		Lead, heavy	3.75
Genuine Russia, according to assort-		Base price, Carload lots mill 14¢		Lead, tea	3.50
ment		Copper Sheets—		Zinc, scrap	4.00
Patent planished, W. Dewees		Sheet copper hot rolled, 16 oz. (quantity			
Wood		lots)			
Galvanized		Sheet copper cold rolled, 1¢ lb advance			
Nos. 12 and 14.....		over hot rolled.			
No. 24.....		Sheet copper polished 20 in. wide and under,			
No. 26.....		1¢ lb square foot.			
No. 28.....		Sheet copper polished over 20 in. wide, 2¢			
No 20 and lighter 36 inches wide, 25¢ higher.		lb square foot.			
		Planished copper, 1¢ lb square foot more			
		than polished.			

NICHOLSON
U.S.A.
TRADE MARK

NICHOLSON

NICHOLSON
U.S.A.
TRADE MARK

Time is not the only saving effected through the use of **Nicholson Files**.

Their hard cutting surface and perfect temper gives them a **lasting quality** that makes them by far the most **economical** of all files to use.

Our Catalog shows what styles to use. Our book, "File Philosophy," tells how best to use them.

PROVIDENCE,

FILE

R. I., U. S. A.

